The Illustrated Dictionary of Gardening

An Encyclopædia of Horticulture.

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HUBERTIA DENTATA

THE

ILLUSTRATED

DICTIONARY OF GARDENING,

A PRACTICAL AND SCIENTIFIC

Encyclopædia of Horticulture

FOR

GARDENERS AND BOTANISTS.

EDITED BY

GEORGE NICHOLSON, A.L.S.,

Curator, Royal Botanic Gardens, Kew.

Assisted by Professor J. W. H. TRAIL, A.M., M.D., F.L.S., in the parts relating to Insects, Fungi, Plant Structure, Horticultural Chemistry, &c.; and J. GARRETT in the Fruit, Vegetable, and General Garden Work portions.

Vol. II.—F to O.

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Preface to Vol. II.

THE SECOND VOLUME OF "THE ILLUSTRATED DICTIONARY OF GARDENING" has been compiled on the lines indicated in the Preface to Vol. I., and it is confidently expected that it will prove a welcome addition to the Garden Library. No pains have been spared to render the work a trustworthy one; and, in many cases, plants popularly known under some "garden" name, are, for the first time in any horticultural publication, referred to their proper places botanically. This often proves anything but an easy task; the uninitiated can scarcely form any idea of the time expended, and the labour involved, in tracing the origin, and determining the correct nomenclature, of a host of plants with which they may be perfectly familiar from a "garden" standpoint. For generic limitation, the "Genera Plantarum," of Bentham and Hooker, has been followed in the great majority of cases; but several of the different sections of such huge genera as *Prunus, Senecio,* &c., have, for garden purposes and convenience of reference, been kept up.

To most of my colleagues at Kew, and also to outside friends who have taken a kindly interest in this work, I am indebted for generous assistance. Special mention may be made of Messrs. James Veitch and Sons, whose unpublished Monograph of the genus *Odontoglossum* was placed in my hands, the article *Odontoglossum* being, to a considerable extent, re-modelled in accordance with the views of Messrs. Veitch; the cultural directions for the genus just mentioned, as well as for *Oncidium,* &c., were written by Mr. W. Watson. To Messrs. Peter Barr and Son this work owes much of the information respecting *Narcissus,* a genus

to the study of which Mr. Barr has devoted many years. Mr. J. Garrett is responsible, as in the First Volume, for the preparation of the articles relating to Fruit and Vegetable Culture, for most of what appertains to Florists' Flowers, and for General Gardening Work.

Professor J. W. H. Trail, M.D., F.L.S., &c., has supplied the articles in this volume on Fungi, Insects, Diseases of Plants, the Nectary, Orchid Fertilisation, Ovary, Ovule, &c. As Dr. Trail has made Plant Diseases a special study, and as the information he gives is more full and complete than any available in other gardening works, this feature of the Dictionary of Gardening will doubtless prove of both considerable interest and value.

The Rev. P. W. Myles, B.A., has taken much trouble in working out the correct derivations of the generic names, and a large number which are inaccurately given in most books, are, in this, corrected.

GEORGE NICHOLSON.

Royal Gardens, Kew.

REFERENCE TO ILLUSTRATIONS OF PLANTS OTHER THAN THOSE FIGURED IN THIS WORK.

IT has been suggested, by an eminent Authority, that many readers would be glad to be informed where reliable Illustrations could be found of those Plants which are not figured in this Work. To meet this want, references to the figures in Standard Authorities have been given, the titles of the Works referred to being, for economy of space, abbreviated as follows:

A. B. R.	Andrews (H. C.). Botanist's Repository. London, 1799-1811. 10 vols. 4to.
A. E.	Andrews (H. C.). Coloured Engravings of Heaths. London, 1802-30. 4 vols. 4to.
A. F. B.	Loudon (J. C.). Arboretum et fruticetum britannicum. . . . London, 1838. 8 vols. 8vo.
A. F. P.	Allioni (C.) Flora pedemontana. Aug. Taur., 1785. 3 vols. Fol.
A. G.	Aublet (J. B. C. F.). Histoire des plantes de la Guiane française. Londres, 1775. 4 vols. 4to.
A. H.	Andrews (H. C.). The Heathery. London, 1804-12. 4 vols. 4to.
B.	Maund (B.). The Botanist. . . . London, 1839. 8 vols. 4to.
B. F. F.	Brandis (D.). Forest Flora of . . . India. London, 1876, 8vo. Atlas, 4to.
B. F. S.	Beddome (R. H.). Flora sylvatica. Madras [1869-73]. 2 vols. 4to.
B. H.	La Belgique Horticole. . . . Ghent, 1850, &c.*
B. M.	Botanical Magazine. London, 1787, &c. 8vo.*
B. M. Pl.	Bentley (R.) and Trimen (H.). Medicinal Plants. London, 1875-80. 8vo.
B. O.	Bateman (James). A Monograph of Odontoglossum. London, 1874. Fol.
B. R.	Botanical Register. London, 1815-47. 33 vols. 8vo.
B. Z.	Botanische Zeitung. Berlin, vols. i.—xiii. (1843-55). 8vo. Leipzig, vol. xiv. (1856).*
C. H. P.	Cathcart's Illustrations of Himalayan Plants. London, 1855. Fol.
Enc. T. & S.	Loudon (J. C.). Encyclopædia of Trees and Shrubs. . . . London, 1842. 8vo.
F. A. O.	Fitzgerald (R. D.). Australian Orchids. Sydney, 1876. Fol.*
F. D.	Flora Danica—usually quoted as the title of the work, Icones plantarum . . . Daniæ et Norvegiæ. . . . Havniæ, 1761 to 1883. Fol.
F. d. S.	La Flore des Serres et des Jardins de l'Europe. 1845-82. 23 vols. 8vo.
Fl. Ment.	Moggridge (J. T.). Contributions to the Flora of Mentone . . . London, 1864-8.
Flora	Flora oder allgemeine botanische Zeitung. 1818-42. 25 vols. 8vo. [New Series] 1843, &c.*
F. M.	Floral Magazine. London, 1861-71, 8vo. 1872-81, 4to.
F. & P.	Florist and Pomologist. London, 1868-84. 8vo.
G. C.	The Gardeners' Chronicle and Agricultural Gazette. London, 1841-65. Fol.
G. C. n. s.	The Gardeners' Chronicle. New Series, 1866, &c. Fol.*
G. G.	Gray (A.). Genera floræ Americæ. . . . Boston, 1848-9. 2 vols. 8vo.
G. M. B.	The Gardeners' Magazine of Botany. . . . London, 1850-1. 3 vols. 8vo.
Gn.	The Garden. London, 1871, &c. 4to.*
G. W. F. A.	Goodale (G. L.). Wild Flowers of America. Boston, 1877. 4to.
H. E. F.	Hooker (W. J.). Exotic Flora, Edinburgh, 1823-7. 3 vols. 8vo.
H. F. B. A.	Hooker (W. J.). Flora boreali-americana. . . London, 1833-40. 2 vols. 4to.
H. F. T.	Hooker (J. D.). Flora Tasmaniæ. London, 1860. 2 vols. 4to. This is Part 3 of "The Botany of the Antarctic Voyage of H.M. Discovery Ships *Erebus* and *Terror*, in the years 1839-43."
H. G. F.	Hooker (W. J.). Garden Ferns. London, 1862. 8vo.
H. S. F.	Hooker (W. J.). Species Filicum.
I. H.	L'Illustration horticole. Gand, 1850, &c. 8vo.*
J. B.	Journal of Botany. . . . London, 1863. 8vo.*
J. F. A.	Jacquin (N. J.). Floræ austriacæ . . . icones . . Viennæ, 1773-8. 5 vols. Fol.
J. H. S.	Journal of the Horticultural Society. London, 1846. 8vo.*
L. B. C.	Loddiges (C.). Botanical Cabinet. London, 1812-33. 20 vols. 4to.
L. C. B.	Lindley (J.). Collectanea botanica. . . . London, 1821. Fol.
L. E. M.	La Marck (J. B. P. A. de M. de). Encyclopédie methodique . . . Botanique. Paris, 1783-1817. 13 vols. 4to.
L. J. F.	Lemaire (C.). Le Jardin fleuriste. Gand, 1851-4. 4 vols. 8vo.
L. S. O.	Lindley (J.). Sertum Orchidaceum. . . . London, 1838. Fol.
L. & P. F. G.	Lindley (J.) and Paxton (J.). Flower Garden. . . . London. . . . 1851-3. 3 vols. 4to.
M. A. S.	Salm-Dyck. Monographia generum Aloes et Mesembryanthemi. Bonnæ, 1836-63. 4to.
N.	Burbidge (F. W.). The Narcissus: Its History and Culture. With a Scientific Review of the Genus by J. G. Baker, F.L.S. London, 1875. 8vo.
N. S.	Nuttall (T.). North American Sylva . . . Philadelphia, 1865. 3 vols. 8vo.
P. F. G.	*See* L. & P. F. G.
P. M. B.	Paxton (J.). Magazine of Botany. London, 1834-49. 16 vols. 8vo.
Ref. B.	Saunders (W. W.). Refugium botanicum. . . London, 1869-72. 8vo.
R. G.	Regel (E.). Gartenflora, 1852, &c.*
R. H.	Revue Horticole . . . Paris, 1852.*
R. X. O.	Reichenbach, *fil.* (H. G.). Xenia orchidacea. Leipzig, 1858. 4to.*
S. B. F. G.	Sweet (R.). British Flower Garden. London, 1823-9. 3 vols. 8vo. Second Series. London, 1831-8. 4 vols. 8vo.
S. C.	Sweet (R.). Cistineæ. London, 1825-30. 8vo.
S. E. B.	Smith (J. E.). Exotic Botany. . . . London, 1804-5. 2 vols. 8vo.
S. F. A.	Sweet (R.). Flora australasica . . . London, 1827-8. 8vo.
S. F. d. J.	Siebold (P. F. de) and Vriese (W. H. de). Flore des Jardins du Royaume des Pays-Bas. Leide, 1858-62. 5 vols. 8vo.
S. F. G.	Sibthorp (J.). Flora græca . . . London, 1806-40. 10 vols. Fol.
S. H. Ivy.	Hibberd (Shirley). The Ivy: a Monograph. London, 1872. 8vo.
Sw. Ger.	Sweet (Robert). Geraniaceæ, the natural order of Gerania. 1828-1830.
Sy. En. B.	Syme (J. T. B.), *now* Boswell. English Botany . . . Ed. 3. London, 1863-85. 12 vols. 8vo.
S. Z. F. J.	Siebold (P. F. von) and Zuccarini (J. G.). Flora Japonica. . . . Lugd. Bat., 1835-44. Fol.
T. H. S.	Transactions of the Horticultural Society. London, 1805-29. 7 vols. 4to.
T. L. S.	Transactions of the Linnæan Society. London, 1791-1875. 30 vols. 4to.*
T. S. M.	Emerson (G. B.). Trees and Shrubs . . . of Massachusetts. Boston. Ed. 2, 1875. 2 vols. 8vo.
W. D. B.	Watson (P. W.). Dendrologia Britannica. London, 1825. 2 vols. 8vo.
W. F. A.	*See* G. W. F. A.
W. O. A.	Warner (R.) and Williams (B. S.). The Orchid Album. London, 1882. 4to.*
W. S. O.	Warner (R.). Select Orchidaceous Plants. London. Series i, 1862-65. Fol. Series ii, 1865-75. Fol.
W. & F.	Woods and Forests. 1883-4. 1 vol. 4to.

* Is still in course of publication.

THE

DICTIONARY OF GARDENING,

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The following are the Abbreviations used:—*fl.* flowers; *fr.* fruit; *l.* leaves; *h.* height; *deg.* degrees; *rhiz.* rhizomes; *cau.* caudex; *sti.* stipes.
The Asterisks (*) indicate plants that are especially good or distinct.

FABA (the old Latin name, from the same root as *phago*, to eat; the seeds are esculent). Bean. Ord. *Leguminosæ*. This genus, which contains but the species described below, is now included under *Vicia*. For culture, *see* **Bean.**

F. vulgaris (common). *fl.* white, with a blackish-blue silky spot in the middle of the wings. *l.* thick, with two to five broad, oval, mucronate leaflets; stipules semi-sagittate, oval; tendrils of leaves almost wanting. *h.* 2ft. to 3ft. As is the case with so many commonly cultivated food plants, the origin and native country of the Bean are doubtful. It was cultivated in prehistoric times in Europe, Egypt, and Arabia; and, according to De Candolle ("Origine des plantes cultivées"), it may be truly native about the Caspian Sea and in North Africa. There is a variety of this species (*equina*) called the Horse Bean.

FABACEÆ. *See* **Leguminosæ.**

FABIANA (named after Francisco Fabiano, of Valencia, in Spain, a promoter of botany). Ord. *Solanaceæ*. A genus containing about eleven species of South American shrubs. *F. imbricata* is a very pretty hardy evergreen Heath-like shrub, of erect, rigid growth. It thrives in almost any soil, and succeeds best when grown against a wall; in the more northern counties of England, it is necessary to protect it during severe weather. Increased readily by cuttings of firm young shoots, inserted in sandy soil, in a cold frame, in spring.

F. imbricata (imbricated).* *fl.* pure white, terminal, solitary, produced in great profusion; corolla funnel-shaped; limb short, reflexed. May. *l.* small, ovate, sessile, crowded. *h.* 3ft. Chili, 1838. This forms an excellent plant for the hardy Heath border, or for the decoration of the cool conservatory. (B. R. xxv. 59.)

FABRICIA. Now included under **Leptospermum** (which *see*).

FADYENIA (named after James MacFadyen, 1800-1850, author of a Flora of Jamaica). Ord. *Filices*. A peculiar and pretty monotypic genus, admirably adapted for a Wardian case. Sori oblong, in two series. Involucre large, sub-reniform, attached by the centre. For general cultivation, *see* **Ferns.**

F. prolifera (proliferous).* *fronds* entire, dimorphous; the sterile ones ⅜in. to 1in. broad, elongated, and rooting at the apex; fertile one ligulate, narrowed below, 6in. to 9in. long, about ½in. broad. Cuba and Jamaica, 1843.

FAGELIA (named after Caspar Fagelius, a cultivator of plants). Ord. *Leguminosæ*. An ornamental decumbent, greenhouse, twining sub-shrub, clothed with clammy hairs. For culture, *see* **Kennedya.**

F. bituminosa (pitchy). *fl.* yellow, keel tipped with violet, on long, distant pedicels; racemes axillary. April to September. *l.* petiolate, pinnately-trifoliolate; leaflets rhomboid; stipules ovate, acuminated. Cape of Good Hope, 1774. (B. R. 261, under name of *Glycine bituminosa*.)

FAGOPYRUM (from *phago*, to eat, and *Pyros*, Wheat; in reference to the seeds being edible). Ord. *Polygonaceæ*. A genus of two or three hardy herbaceous plants. Perianth cut into five equal divisions, and not increasing in size along with the fruit, like some of its allies. Seed mealy. Leaves cordate or lanceolate. Stems erect, branching. The only species worthy of mention is *F. esculentum*. For culture, *see* **Polygonum.**

F. esculentum (edible). Common Buckwheat; Brank. *fl.* pink. Stem 2ft. to 3ft. high, branched. Central Asia; but now naturalised in various parts of Europe. Annual. Buckwheat is principally used in England as a food for pheasants; but on the Continent, and in some parts of the United States, it is largely employed for human food.

FAGRÆA (named after Jonas Theodore Fagræus, 1729-1797, a physician and botanist). Syns. *Cyrtophyllum*, *Kentia* (of Steudel), *Kuhlia*, *Picrophlœum*, and *Utania*. Ord. *Loganiaceæ*. A genus containing about thirty species of ornamental stove trees or shrubs. Flowers showy; corolla funnel-shaped, with an imbricate, five (rarely six or seven) cleft limb. Leaves large, opposite, broad, coriaceous. The species thrive in a compost of loam, peat, and sand. Cuttings of young shoots, made about April, root readily in sand, under a bell glass, with bottom heat. The species described below are probably the only ones yet in cultivation.

F. auriculata (auricled).* *fl.* yellow, very large; peduncles terminal, usually by threes. *l.* coriaceous, broad, cuneate-oblong, acute, veiny; interpetiolar stipules two-lobed, recurved. Java. An epiphytal shrub.

F. obovata (obovate). *fl.* white, fragrant, coriaceous, smaller than those of *F. zeylanica*; peduncles terminal, three-flowered, sub-corymbose. *l.* 5in. to 6in. long, thick; petioles furnished with a few glandular ciliæ, connected by interpetiolar stipules. *h.* 12ft. Ceylon, 1816. Tree. (B. M. 4205.)

Fagræa—*continued.*

F. zeylanica (Cingalese). *fl.* white, large, few, terminal, umbellate. *l.* crowded, obovate-oblong, obtuse; bracts ovate, obtuse. Stem sub-quadrangular, shrubby, erect. *h.* 12ft. Ceylon, 1816. (B. M. 6080.)

FAGUS (the old Latin name, akin to Greek *Phegos*, an Oak, and perhaps derived from *phago*, to eat; the nuts were used as food in the early ages). Beech. ORD. *Cupuliferæ*. A genus containing about fifteen species of handsome, deciduous or evergreen trees or shrubs, widely distributed throughout the temperate and colder regions of both Northern and Southern hemispheres. Male flowers disposed in long-stalked, drooping heads; calyx four to seven-lobed. Female flowers two to four together, in a four-partite involucre of imbricating bracts. Leaves entire or toothed. The common Beech grows well in most dry soils, preferring a sandy loam, with chalky bottom, and light loams generally, to heavier soils. Propagation is effected by means of the seeds or nuts, which ripen in October. In order to keep them in a fit condition for sowing during the ensuing March or April, they should, after being

FIG. 1. BRANCHLET OF FAGUS SYLVATICA, showing Male and Female Flowers.

thoroughly dried, be mixed with about double the quantity of dry sand, in tubs or barrels, and stored in a loft or some cool place. Provided mice can be kept off the ground, it is better to sow the nuts immediately after they have been collected; they may either be sown in drills or in beds, covering with about 1in. of soil. As the Beech does not always transplant very readily, it will be necessary to replant in nursery rows every two or three seasons, until the seedlings have attained the desired size and are placed in the positions they are intended to occupy permanently. The numerous varieties of our native species are propagated by grafting on the type. The common Beech succeeds admirably as a hedge, which it is usual to trim close; and as the dead leaves cling to the stems in winter and during the early spring months, they give valuable shelter. An oil is expressed from Beech nuts.

F. antarctica (Antarctic).* *l.* ovate, blunt, glabrous, attenuated at the base, doubly dentate, alternate, petiolate, 1½in. long. Tierra del Fuego, 1830. A deciduous shrub or tree, with rugged, tortuous branches. (H. F. A. 123.)

Fagus—*continued.*

F. betuloides (Birch-like).* Evergreen Beech. *l.* ovate-elliptic, obtuse, crenulate, leathery, shining, glabrous, round at the base, on short footstalks. Tierra del Fuego, 1830. An evergreen tree. (H. F. A. 124.)

F. ferruginea (rusty).* *l.* ovate, acuminate, thickly toothed, downy beneath, ciliate on the margin. United States, 1766. A large, deciduous tree, very closely resembling the common European species, from which it is distinguished by its longer, thinner, and less shining leaves.

F. obliqua (oblique). *l.* ovate-oblong, oblique, somewhat rhomboid, blunt, doubly serrated, entire at the base, attenuated into the petioles, and somewhat downy. *h.* 50ft. Chili. Hardy, deciduous.

F. sylvatica (sylvan). Common Beech. *l.* oblong-ovate, obscurely toothed; margin ciliate. *h.* 60ft. to 100ft. A triangular area between Norway, Asia Minor, and Spain. A large, deciduous tree. See Fig. 1. Of the numerous varieties of this splendid species, the following are the most important: *argenteo-variegatis*, leaves silver-striped; *asplenifolia*, *heterophylla*, *incisa*, and *quercifolia*, with more or less cut leaves; *cuprea*, leaves copper-coloured; *aureo-variegatis*, leaves gold-striped; *purpurea*, leaves deep purple; and the weeping or pendulous form, *pendula*.

FAIR MAIDS OF FRANCE. *See* **Ranunculus aconitifolius** and **Saxifraga granulata.**

FAIR MAIDS OF KENT. *See* **Ranunculus aconitifolius.**

FAIRY PRIMROSE. *See* **Primula minima.**

FAIRY RINGS. Green circles, or parts of circles, seen in pastures, and produced by the peculiar mode of growth of several species of Agarics and other Fungi. *Agaricus arvensis*, *A. gambosus*, and *Marasmius oreades*, are good examples of those usually inhabiting Fairy Rings.

FALCATE, FALCIFORM. Bent like a sickle.

FALCONERA. This genus is now included under *Albuca*.

FALKIA (named after John Peter Falk, 1730-1774, a Swede, Professor of Botany at St. Petersburgh). ORD. *Convolvulaceæ*. A genus containing three or four species of greenhouse or half-hardy, herbaceous plants, from South Africa. *F. repens* is a very pretty, little, greenhouse, evergreen creeper, thriving in a compost of loam and peat, or any light soil. Increased by cuttings, inserted under a hand glass, in April; or by divisions.

F. repens (creeping).* *fl.* red, with a paler throat; corolla campanulate, crenated; peduncles hardly longer than the leaves. May. *l.* scattered, petiolate, cordate-ovate, obtuse, entire. Stems decumbent, rooting; branches filiform. Cape of Good Hope, 1774. (B. M. 2228.)

FALLUGIA (named after Fallugius, a Florentine botanist, who flourished about the end of the seventeenth century). ORD. *Rosaceæ*. A monotypic genus. The species is an erect, much-branched shrub. For culture, *see* **Sieversia** (to which it is allied).

F. paradoxa (paradoxical). *fl.* white, large, showy, sub-corymbose, pedicellate. *l.* alternate, petiolate, irregularly three to five-lobed or pinnatifid, rarely entire; lobes linear, obtuse; margins recurved, snowy underneath. New Mexico. (B. M. 6660.)

FALSE ACACIA. *See* **Robinia Pseudo-acacia.**

FALSE DITTANY. *See* **Dictamnus albus.**

FALSE DRAGON-HEAD. *See* **Physostegia.**

FALSE LARCH. *See* **Pseudolarix.**

FAME FLOWER. *See* **Talinum teretifolium.**

FAN PALM. *See* **Chamærops, Corypha,** and **Sabal Blackburniana.**

FAN-SHAPED. Plaited like a fan; *e.g.*, the leaves of *Chamærops* and *Livistona*.

FARAMEA (said to be the native name in Guiana). SYN. *Tetramerium*. ORD. *Rubiaceæ*. A tropical American genus, containing about forty species, only one of which, perhaps, is in cultivation. *F. odoratissima* is a very ornamental, sweet-scented, stove, evergreen shrub, with flowers about the size of those of *Jasmine*. It thrives in fibry peat and loam, with the addition of a little silver sand

Faramea—*continued.*

and some small lumps of charcoal. Cuttings, made in spring, will root, if inserted under a bell glass, in heat.

F. odoratissima (very sweet-scented).* *fl.* white, in terminal corymbs. *l.* oval-oblong, acutish at the base, abruptly acuminated at the apex. *h.* 6ft. West Indies, 1793.

FARFUGIUM GRANDE. *See* **Ligularia Kæmpferi aureo maculata.**

FARINA. Meal.

FARINACEOUS, FARINOSE. Mealy; having the texture of flour.

FARSETIA (named after Philip Farseti, a Venetian botanist). ORD. *Cruciferæ*. A genus of about twenty species of hardy or half-hardy, branched, erect herbs or sub-shrubs, more or less hoary or downy. They are natives of the Mediterranean region, Africa, and Asia Minor to Northern India. Inflorescence racemose or spicate. Leaves entire, opposite. Most of the species are very pretty, and the hardy perennials are well adapted for growing on rockwork, borders, &c., in ordinary garden soil. The less hardy sorts thrive well in a compost of sandy loam and peat. All are easily increased by seeds.

F. ægyptica (Egyptian). *fl.* white. June and July. *l.* linear, pressed, hoary. Stems shrubby, erect, much branched. *h.* 1ft. North Africa, 1788. Half-hardy.

F. clypeata (buckler-shaped). *fl.* yellow. June. *l.* oblong, repand. Stems herbaceous, erect. *h.* 1ft. to 2ft. South Europe, 1596. Hardy.

F. lunarioides (Lunaria-like). *fl.* yellow; sepals whitish. June. *l.* oblong-obovate, stalked, hoary. Stems suffruticose, ascendent. *h.* 1ft. Grecian Archipelago, 1731. Hardy. (B. M. 3087.)

FASCIATED. When a stem becomes much flattened, instead of retaining a cylindrical figure; *e.g.*, the Cockscomb.

FIG. 2. FATSIA JAPONICA.

FASCICLED, FASCICULAR, or **FASCICULATE.** In bundles or parcels.

FASTIGIATE. Tapering to a narrow point, like a pyramid.

FATRÆA. Included under **Terminalia** (which *see*).

FIG. 3. FATSIA PAPYRIFERA.

FATSIA (derived from the Japanese name of one of the species). ORD. *Araliaceæ*. A genus of half-hardy shrubs or small trees, allied to **Aralia** (which *see* for culture). All the species are described below.

F. horrida (horrid). *fl.* in terminal panicles. *l.* palmately lobed, cordate, petiolate, prickly. Stems thick, armed with yellow spines. *h.* 6ft. to 12ft. North-west America, 1829. Hardy. SYN. *Panax horridum.* (H. F. B. A. 98.)

F. japonica (Japanese).* *l.* large, leathery, digitate, deep shining green. Stem straight, forming an umbrella-like head. *h.* 3ft. to 5ft. Japan. A very fine half-hardy evergreen shrub for sub-tropical gardening. It is easily raised from seed, which should be sown in gentle heat; and portions of the stem, treated as cuttings, root freely. SYNS. *Aralia japonica* and *A. Sieboldii.* See Fig. 2.

F. j. variegata (variegated).* *l.* blotched and margined with white. Japan. Half-hardy.

F. j. v. aurea (golden-variegated).* Somewhat larger and stronger than the foregoing, and with a rich yellow variegation. Distinct and fine. Japan.

F. papyrifera (rice-paper-tree).* *fl.* greenish, in drooping panicles, which are 2ft. to 3ft. long. *l.* from 8in. to 12in. long, five or seven-lobed, clothed (as are also the stems) with a kind of down, but ultimately glabrous. Stem branching above. *h.* 6ft. to 8ft. Formosa, 1852. A noble half-hardy plant, which must be protected from all winds; very useful for sub-tropical gardening. SYN. *Aralia papyrifera.* See Fig. 3. (B. M. 4897.)

FAUX. The orifice of a calyx or corolla.

FAVEOLATE, FAVOSE. Pitted or excavated, like the cells of a honeycomb.

FEATHER GRASS. *See* **Stipa pennata.**

FEATHER-VEINED. Having veins which proceed from a midrib at an acute angle.

FEBRIFUGAL, FEBRIFUGE. Efficacious in moderating fevers.

FEDIA (supposed to be from *fedus*, the same as *hordus*, a kid, in allusion to the smell of the plant; but possibly one of Adanson's meaningless names). ORD. *Valerianeæ*. A pretty glabrous annual herb. Leaves entire or toothed. It is of easy culture in moderately good garden soil. Seeds should be sown in pots, in March,

Fedia—*continued.*

and the seedlings planted out thickly in the latter part of April, at which time seed may also be sown in the open border.

FIG. 4. FLOWERING BRANCH OF FEDIA CORNUCOPIÆ.

F. Cornucopiæ (Cornucopia-like).* *fl.* red, corymbose, in fascicles; peduncles thickened, fistular. July. *l.* ovate-oblong, toothed; lower ones petiolate, upper ones sessile. Stem purplish. *h.* 6in. South Europe, &c., 1796. See Fig. 4. (B. R. 155, under name of *Valeriana Cornucopiæ.*)

FEEA. *See* **Trichomanes.**

FELICIA (from *felix*, happy; in allusion to the cheerful appearance of the plants). ORD. *Compositæ.* A genus of about forty-five species of dwarf-growing sub-shrubs (rarely annual herbs), two of which are from Abyssinia, and all the rest from Southern Africa. *Felicia* is very nearly allied to *Aster.* Flower-heads radiate; ray-florets blue or white, the disk yellow; involucre hemispheric or broadly bell-shaped, with from two to a large number of series of narrow, imbricated, scarious-edged bracts. Leaves alternate, entire or toothed. The shrubby species like cool greenhouse treatment, and flourish in sandy peat. Propagated by seeds; or by cuttings, struck in sandy soil, under a bell glass.

F. fruticosus (shrubby).* *fl.-heads* solitary, upon terminal, solitary, naked, very slender peduncles; ray-florets purple, linear, acute, with one or two serratures at the margin; centre florets yellow, tubular; involucre ovate-cylindrical, of several linear-oblong, closely imbricated scales. May. *l.* spreading, linear, approaching to spathulate, impressed with dots; margin quite entire and recurved. Stem woody, much branched in a zigzag manner. *h.* 1ft. to 2ft. Cape of Good Hope. (B. M. 2718, under name of *Aster fruticosus.*)

F. reflexa (reflexed). *fl.-heads* red, white, terminal, closely resembling the common Daisy. Winter. *l.* ovate, sub-imbricate, recurved, ciliate. *h.* 1½ft. to 3ft. Cape of Good Hope, 1790. Shrubby. (B. M. 884, under name of *Aster reflexus.*)

FELWORT. *See* **Swertia.**

FEMALE FERN. A common name of **Asplenium Filix-fœmina** (which *see*).

FENCES. *See* **Hedges.**

FENESTRATE. Having a hole or gap through a membrane, and so resembling a window in a wall.

FENNEL (*Fœniculum vulgare*). A hardy perennial herb, native of temperate Europe, North Africa, and Western Asia, now become naturalised in some parts of this country. It is cultivated for the use of its leaves in fish sauces and for garnishing. The stalks are sometimes blanched, and eaten either boiled or raw. The seeds are also used for flavouring. Fennel (see Fig. 5) may be easily propagated by seeds or by division. The former may either be sown in drills 15in. apart, and the

Fennel—*continued.*

FIG. 5. FENNEL.

plants afterwards thinned to a similar distance, or be sown in a bed, and transplanted when large enough. If seeds are not required, the tops should be occasionally removed, as this will encourage the production of young leaves. A plantation will last for several years.

FENNEL FLOWER. *See* **Nigella.**

FENNEL, GIANT. *See* **Ferula.**

FENUGREEK. *See* **Trigonella Fœnum græcum.**

FENZLIA. This genus is now included under **Gilia** (which *see*).

FERDINANDA. This genus is now included under **Zaluzania** (which *see*).

FEREIRIA. *See* **Hillia.**

FERNANDEZIA (named after George Garcias Fernandez, a Spanish botanist). ORD. *Orchideæ.* A small genus of epiphytal stove orchids, allied to *Brassia.* They are not of much horticultural beauty. The species best known is *F. robusta.* For culture, *see* **Brassia.**

F. robusta (robust). *fl.* bright yellow, barred and spotted with red on the lower portion of the lip; sepals oblong apiculate, bent backwards; petals ovate, obtuse, stretching a little forwards; lip longer and larger than the petals, three-lobed. May. *l.* keeled, 1½in. long, sharp at the extremities. Guatemala, 1841. This, the largest species of *Fernandezia*, is closely allied to *Lockhartia lunifera*, figured in Reichenbach's "Xenia." (B. M. 5592.)

FERNELIA (named after J. F. Fernel, 1497-1558, physician to Henry II. of France). ORD. *Rubiaceæ.* A genus containing four species of small glabrous stove evergreen shrubs, having much the habit of Box. Pedicels axillary, very short, bracteolate, one-flowered; corolla small. Leaves opposite, small, coriaceous, shortly petiolate, obovate-oblong, or sub-orbicular. The species described below requires treatment similar to **Rondeletia** (which *see*).

F. buxifolia (Box-leaved). *fl.*, lobes of the corolla obtuse. Berry obovate, crowned by the subulate lobes of the calyx. *l.* five to six lines long, and three to four broad. *h.* 1ft. to 3ft. Mauritius, 1816.

FERNS. Whether viewed collectively as plants of extreme beauty and interest when grown as specimens, or for their general usefulness in arrangements with flowering subjects, Ferns are indispensable, and possess attractions peculiar to themselves. The very large number of genera now in cultivation, including native and exotic, stove, greenhouse, and hardy, supply means of making a suitable selection for every requirement. Remarkable variation in size and habit is most noticeable among Ferns, apart from the extreme conditions under which the different ones succeed. The now almost universal use of plants and cut fronds intermixed in floral decorations, has led to their production in immense quantities annually, to supply the demand for a few of the more popular of genera and species that are suitable for the purpose. The popularity of Ferns is ever increasing, as ideas regarding the supposed difficulty in their culture, and the amount of heat required, have been of late considerably modified, many being found to succeed in much cooler positions than was at one time supposed to be suitable. The majority require more or less heat, but many that are kept in a high temperature would be healthier and do better in a somewhat cooler one. Hardy Ferns are, perhaps, more plentiful in varieties than in distinct species, although the latter are numerous. Both are interesting and useful for various positions outside, and are in combination extremely diverse in general habit. It will be impracticable, on account of space, to describe here separately the cultivation of every genus referred to this heading. The following general remarks respecting the treatment of the different groups, according to the amount of heat or other special requirements, with cultural notes on some of the principal genera, may, however, with the description accompanying each individual genus separately, prove sufficiently suggestive for the treatment of all.

PROPAGATION. This is effected in various ways, according to the different habits or modes of growth exhibited in the several types. The most general plan of propagation is by spores, but with many species it is at best difficult, and in many cases quite impossible, to obtain these, and raise plants from them successfully. The most popular of Ferns, Adiantums, and several species of *Pteris*, are easily raised in immense quantities from spores. All Ferns that form several crowns may be increased by division; and those with creeping rhizomes, like many of the Davallias, are easily perpetuated either by layering the points or removing portions that have formed roots. A few—Aspleniums particularly—produce small bulbils along the upper portion and at the end of the fronds, and these eventually form plants, if removed and placed in soil. The increase of Filmy Ferns is, in most cases, an extremely delicate operation. Plants imported from their native habitats, with every care taken in transit, frequently do not live to become established, even if they arrive in fairly good condition. These may be propagated by carefully made divisions of such plants as become established and grow well. Tree Ferns are imported in quantities, and a large proportion generally succeed. Young plants may be raised from spores, where obtainable, but it would take many years for them to grow to the size of imported stems. The spores of many of the Tree Ferns germinate freely enough, but, under cultivation, never advance beyond the prothallus stage.

Spores. The fronds from which spores are required should be carefully examined at frequent intervals, when they are beginning to ripen, in order to obtain the spores at the proper time. When the sori begin to turn brown, the fronds should be cut and allowed to dry in close paper bags. The sooner they are sown, after being kept a few days, the better, as any part of the year is suitable for the operation, early spring being, however, preferred for the majority of species. They should be sown

Ferns—*continued.*

in pots or shallow pans that have been half-filled with crocks, the remainder being filled to within ½in. of the top with a mixture of fine sifted loam and very small pieces of crushed brick. An even surface may be obtained by pressing firmly with the bottom of another pot. The soil should then be watered and allowed to drain before the spores are sown, as by watering afterwards the latter might be washed away. Fern spores are extremely minute, and, consequently, should be scattered very thinly over the surface of the soil, pieces of glass being placed over the tops of the pots. The pots should be stood in saucers of water and placed in a close frame of a propagating house, being kept shaded at all times during sunshine, but not in dull weather. Laying pieces of paper on the outside of the frame, and removing them when not required, is a handy method usually adopted. When the spores are sufficiently grown to be visible as very minute plants —a stage that varies considerably, with different Ferns, in the time taken to reach it—they should be very carefully pricked off in pots of similar soil, filled, this time, level with the top. Very small patches must be taken on a stick, having the least notch cut in the end, and they should be merely pressed into the new soil about 1in. apart. No water should be applied overhead until the little plants have been pricked off some time, and have formed fronds. Sufficient will have been supplied by the pots being placed in water, and the moisture contained inside the frame, which is not usually one with bottom heat. Adiantums are frequently fit for pricking out in a month or six weeks after being sown. These, or any others, should be returned to a similar frame afterwards, and kept close until small plants are established, when air should be very gradually admitted. If conditions are suitable, the young Ferns grow fast in the spring or summer; and the next shift should be into pots singly, or, in the case of Adiantums, each little bunch of plants may be treated as one, for quickly forming decorative subjects. Raising Ferns of any description from spores is an exceedingly delicate operation, and one that requires considerable care and attention to accomplish successfully. It frequently happens that spores obtained from fronds of any particular Fern which may have been kept separated from others, will, when sown, apparently produce a host of young plants that eventually are found to belong to another and commoner species or genus. The fact of spores being so light as to be removed and carried by a breath of wind, may account for the presence of the commoner one, that would probably overgrow the other; or good spores of the one desired may not have been present at all. The mode of treatment above described applies to the raising of both stove and greenhouse Ferns, and, with the exception of a cooler temperature, will be also suitable for the hardier species. Young plants should be potted on before they are very full of roots, as, if allowed to become starved in the younger stages, it is a long time before they recover.

Divisions, &c. The best time for dividing Ferns, or for propagating by means of the creeping rhizomes, is just before growth commences, in February or early spring. It is best not to divide too severely, as small plants are much better obtained from spores if that plan be practicable. Rhizomes should be pegged to a piece of peat, or on small pots of soil, and allowed to form roots before being detached. The insertion of the little bulbils in pots of soil, in a close frame, will soon increase the stock of those species which produce them.

STOVE FERNS. An idea is often formed that tropical Ferns require a great heat at all times, with constant heavy shading in summer, and but little air at that season as well. This is altogether a mistake, as the result is invariably weak, elongated fronds, that are at once subject to all insect pests, and are rarely strong enough to stand any change to which it may be necessary

Ferns—*continued.*

to subject them. Blinds on rollers, that admit of being let down and removed as desired, should be used. Although Ferns delight essentially in shade and moisture, both may be carried to an excess, especially in winter time, when all should be at rest. The growing and resting periods are as necessary with many Ferns as with flowering plants, although the ripening in autumn, as ordinarily understood, is not of so much importance. The general arrangement of stove Ferns greatly depends on the structure and space at command. Adiantums, Davallias, Gymnogrammes, and Platyceriums, may be cited as examples for situations where most light is obtainable, and only a thin shading applied in sunny weather; while Acrostichums, and the stove species of *Aspidium*, *Asplenium*, *Nephrodium*, and *Pteris*, succeed in darker or more shady positions. The introduction of Tree Ferns produces a fine effect where there is sufficient height, but, if planted out, these soon require much more room than it is possible to obtain in the majority of stoves. By growing them in tubs, and plunging, a more suitable appearance is presented, the restriction of the roots having a corresponding effect on the rate of growth in the fronds. Any repotting should be performed before growth commences, as, if it is deferred till afterwards, many of the young fronds will become crippled. For stove Ferns, a growing season of eight months should be allowed, namely, from February till September inclusive. The other four months should be the resting period, when a night temperature of 50deg. to 55deg. will be sufficient, with a minimum rise by day of 5deg. more. A drier atmosphere must also be maintained, and less water applied to the roots, at the same time avoiding an extreme in the latter case. When growth commences, the minimum night and day temperatures may be gradually raised, until, in summer, the former will seldom go below 60deg. or 65deg. Air should be carefully admitted, and plenty of water applied to the roots and amongst the pots, with a view to the production of fronds of moderate growth and good substance—conditions not to be insured by a close atmosphere and very high temperature. Light syringings may be occasionally applied to most stove Ferns in summer, but too much has a tendency to weaken many of the fronds. Adiantums, Gymnogrammes, and, generally speaking, species with powdery or very hairy fronds, should not be syringed at any time. The whole beauty of Ferns consists in the full development of the fronds; and if these are to be kept in good condition afterwards, until the new ones of the following year appear, it is important that the plants be kept properly watered and subjected to treatment, in summer, calculated to produce a moderate amount of solidified growth, that, in the autumn, should be thoroughly ripened by the admission of sun and air to the structure in which the Ferns are grown. If, as before recommended, blinds on rollers are in use for summer shading, they will, of necessity, have to pass over the roof ventilators. This has an advantage both of breaking the force of the wind and preventing an undue evaporation of moisture from the inside. If found to fit too closely, blocks may easily be fixed to the rafters at the top, to keep the shading a little open.

GREENHOUSE FERNS. A large number of Ferns, usually grown and treated as stove subjects, succeed equally well, but do not grow quite so fast, in a greenhouse temperature, and, wherever employed, either alone or in combination with flowering plants, are much appreciated. A more interesting structure than a cool Fernery attached to a conservatory, when well stocked and carefully arranged, can scarcely be imagined. The majority of Ferns succeed in comparatively small pots, and are consequently well suited for mixing with other occupants of the side stages. The stronger-growing ones are also well adapted for planting in permanent beds or amongst other plants, such as Camellias, &c., where not too much crowded, the partial shade and moisture suiting the Ferns admirably.

Ferns—*continued.*

Nearly all Adiantums do well under greenhouse treatment in summer, but must be removed to warmer quarters for the winter. Many Nephrodiums and species of *Pteris*, particularly *P. longifolia*, *P. serrulata* and its varieties, and *P. tremula*, do better planted out in a cool structure than anywhere else. *Lomaria gibba*, and other species, are among the most beautiful of cool decorative Ferns, and the same may be said of *Asplenium bulbiferum*, and others from Australia and New Zealand: *Davallia canariensis*, *Nephrolepis exaltata*, *Onychium japonicum*, *Woodwardia radicans*, *&c. Todea barbara* is well adapted for planting out in a position where considerable space can be allowed for its large fronds to develop; it may also be grown in pots, any cool house, or even a sheltered position outside, with protection in frosty weather, suiting it. The genus *Gleichenia* contains many beautiful species that do not require much heat, excepting two or three from tropical countries. If grown in large pans, and tied out with neat stakes, beautiful specimens may be obtained under greenhouse treatment. These are propagated by layering the slender rhizomes, or by separating rather large pieces from established plants, and potting separately. The shade necessary for ordinary greenhouse flowering plants in summer will also be suitable for Ferns, plenty of moisture being at that season supplied at the roots and, with few exceptions, such as Adiantums, overhead.

FERNS SUITABLE FOR BASKETS. Hanging baskets, either in the stove or greenhouse, are, at all times, an additional attraction, and the elegant and graceful habit of many Ferns constitutes them excellent subjects for use in that way. Baskets, made in different sizes, of stout galvanised wire, may be suspended from the roof, and, if carefully watered, the plants will succeed extremely well in most cases. Many are seen to much better advantage, especially those with long and drooping fronds, than when grown in pots for stage decoration. Some of the fast-growing Selaginellas are most useful to plant with basket Ferns, for covering the soil or hanging down. Adiantums will, again, be found very attractive, particularly *A. caudatum*, *A. cuneatum*, *A. gracillimum*, and *A. Moorei*, with *Asplenium Belangeri*, *A. longissimum*, and *A. viviparum; Davallia dissecta* and *D. pallida; Gymnogramme schizophylla; Nephrolepis davallioides* and *N. exaltata*, and many others that are of somewhat similar habit. Nearly all of these are amenable to cool-house treatment in summer.

FILMY FERNS. These constitute a distinct class, requiring different treatment from any other members of the family. Very few do well in an open house, as sufficient atmospheric moisture cannot be obtained. On the whole, they do not require much heat, being often found to grow stronger and keep in better health when cultivated in close cases, in a cool Fernery, than when placed in similar cases in the stove. Filmy Ferns should never be watered overhead, but the stones and moss amongst which they are generally grown must be kept continually moist by having water poured on from the small spout of a can. This, when evaporating inside the inclosed case, becomes condensed on the extremely numerous divisions of the fronds as represented in the majority of species, and its continued presence there invariably indicates good health and the frequency with which it will be necessary to give water. Pieces of rough fibry peat and loam, with charcoal and sphagnum, are most suitable for Filmy Ferns. Nearly all that grow in soil succeed better when planted amongst stones, while those that form rhizomes should be placed on blocks of peat, dead pieces of Tree Fern, &c. They must always be shaded from sunshine; and not much light is required at any time. The difficulty generally experienced is in establishing the plants; when once they begin to grow and increase, the treatment is, in most cases, simple enough. *Hymenophyllum*, *Todea*, and *Trichomanes*, are three of the principal genera

Ferns—*continued.*

among Filmy Ferns. *Todea superba* is a vigorous species, having large fronds of a filmy texture; and *T. hymenophylloides* is smaller-growing, but very desirable; both being beautiful and more easily grown than the majority of the plants in this section.

WARDIAN CASES. Ferns used for decorating Wardian cases must only include those of small or moderate growth, the space inside being very limited. The system admits of more moisture being kept round the plants than would be possible in an open room where the air is frequently dried either by burning gas or a fire. It is always important, in changing plants in these cases that become unhealthy, to substitute others from a cool house, as, if insufficiently hardened, the young fronds soon wither and die. Ample drainage must be provided, and, if plants in pots are used, the latter should be covered with growing sphagnum. Ferns in Wardian cases keep fresh and attractive for a long time if they receive proper attention. Cases somewhat similar in construction, may be used in cool houses for small collections of Filmy Ferns.

FIG. 6. DEAD TREE FERN, DECORATED WITH FERNS.

TREE FERNS. Considerable space and lofty houses are essential for growing and exhibiting Tree Ferns in their true characters. In Ferneries of limited size, where a few are cultivated, it is best to restrict their root growth in large pots or tubs, which also allows of their being re-arranged occasionally when overgrowing other smaller plants. In very large conservatories, a few permanent specimens planted out in well-drained borders, succeed, perhaps, better than in any other position, and always present a majestic appearance unexcelled by any other plants similarly employed. *Alsophila australis* and *A. excelsa*, *Cyathea dealbata* and *C. medullaris* (the latter is probably the tallest-growing of all our cultivated Ferns), with *Dicksonia antarctica*, are the best for culture in the greenhouse. All these may also be used in sub-tropical gardening outside in summer, in sheltered,

Ferns—*continued.*

shady places. There are many stove species of Tree Ferns, all of which are beautiful, and worthy of cultivation in large heated structures. They all, especially Alsophilas, delight in plenty of atmospheric moisture and shade. The stems of imported Tree Ferns should, on their arrival, be covered with damp moss or canvas, and be kept moist by syringing until the new fronds appear. The time this takes varies according to the condition in which they arrive, and the season. When the head of fronds is established, the covering may be removed from the stem; but frequent syringing in summer time is of the highest importance, as by far the greater portion of the stems of many is literally a mass of roots requiring a quantity of water. Tree Ferns, in bad health, may often be greatly improved by covering the stem from the base to the fronds with 1in. of sphagnum, and tying it on with string. If kept moist, the roots soon fill the moss, and the stem is thus considerably enlarged. Tree Ferns that are dead on arrival may be utilised by covering with epiphytal or other small Ferns for stove or greenhouse decoration (see Fig. 6), the top being scooped out, and a free-growing variety with a pendent habit inserted and planted in soil; others being fastened on the side with blocks of peat and some small wire.

HARDY FERNS. These are all attractive, and the majority succeed best when planted on rockwork in a shady situation, sheltered from high winds. A great diversity, both in size and habit, is represented by the British species and their innumerable varieties, apart from those introduced from North America, Japan, &c. Many suitable positions for hardy Ferns may be found in most gardens where their culture is not now attempted. They should have a good depth of soil, and plenty of water in summer. In the case of a collection, a pile of rockwork, built with rough stones, allows of a place being selected for all, according to their size and habit. A good clump of those which are plentiful should be planted together, and sufficient space allowed them to grow and develop, as in this way the different characters are much better shown than when only single plants are used. Attention in their arrangement should also be directed in placing the evergreen and deciduous species irregularly throughout the space covered, so that the whole may be, more or less, furnished at all seasons. In building a rockwork for hardy Ferns, the requirements of the plants must be the main object, large, well-drained pockets being insured in preference to the appearance of the stones, that are, in great part, hidden by the fronds. Loam and peat, with a quantity of crushed stone or brick, intermixed and used round the roots when planting, materially assist them to become established. The Royal Fern (*Osmunda regalis*) is one of the most handsome, and succeeds best when planted in a partial bog, or by the side of water.

UNDERGROUND FERNERY. This is an interesting structure, to be seen only in a few places, where the owners bestow special attention on Fern culture in its various aspects. It consists of a large cavity, dug in the middle of a hill, and covered with sheet glass, the hill itself being surrounded on the summit with trees. A flight of steps communicates with the interior, where Ferns are grown on the inside of the cavity in prepared soil, narrow paths or stepping stones being provided on which to walk amongst them. A fountain, or other arrangement for water, supplies the necessary moisture. The plants do not require artificial heat, as they are not much affected by fluctuations of temperature outside, and a subdued light is constantly admitted by the glass overhead. A view of an underground Fernery is shown in Fig. 7.

SOIL, POTS, &C., FOR FERN CULTURE. Nearly all Ferns require a quantity of water in summer, and rarely need to be dry at the roots at any season, consequently a very important matter is that of efficient drainage.

Ferns—*continued.*

Anything like a sour or waterlogged soil is either detrimental or fatal, even to those which are not quickly injured in other respects. Success in the cultivation of established plants depends more on this, with careful watering, temperature, atmospheric moisture, proper shade, &c., than on any soil in which they may be grown.

FIG. 7. VIEW OF UNDERGROUND FERNERY.

Adiantums, for instance, succeed well either in peat or loam alone, the texture of the fronds being firmer in the latter instance, and presenting apparently the only difference. A large proportion of peat was at one time considered necessary for all Ferns, but the superior qualities of leaf soil in their culture, where it can be obtained, have been more fully recognised of late, with considerable advantage to the plants. Soft sandstone, mixed with the soil, tends to keep it porous, and suits some varieties better than others; and charcoal may be used freely with all. The different habits will often suggest the mode of treatment required. It will not be far wrong to say that a compost of half loam, to which is added an equal quantity of leaf soil and peat combined, and sufficient charcoal, small pieces of crocks, or sharp sand, to keep the whole open, may be used successfully for all Tree Ferns and any established plants of *Adiantum*, *Aspidium*, *Asplenium*, many species of *Davallia*, *Gymnogramme*, *Lomaria*, *Nephrodium*, *Pteris*, and any others of similar habit. The species of *Acrostichum*, *Davallia*, &c., that form slender rhizomes, must be attached to something on which they can grow. A good plan is to cultivate in pans, placing an inverted pot or a piece of Tree Fern stem in the middle, and then building a small mound on the top with lumps of peat, loam, and sphagnum, afterwards fixing the rhizomes to the surface with small pegs. Epiphytal Ferns, of which *Platycerium* is a well-known and distinct genus, often succeed admirably if fastened with a little moss and peat to a block of wood, and suspended in the stove. They

Ferns—*continued.*

should be kept rather dry in winter. Similar composts, as advised above, if passed through a sieve, may be used for young plants. Ferns succeed in pots comparatively small for the size of plants, if due attention is given to watering. Small pots have also an advantage in appearance; and any deficiency in the quantity of food contained in the soil may be supplied with applications of manure water during the growing season.

Insects. Ferns, especially those under stove treatment, are liable to be attacked by several destructive insect pests. Thrips are their greatest enemies, causing irreparable damage to the fronds. Frequent fumigating becomes a necessity; this must be done lightly and with the greatest care, on account of the tender growth. Any Aphides will also be destroyed by the smoke at the same time. Brown and White Scale are sometimes plentiful, and these must be removed by sponge or brush. The first-named is the one most common on Ferns, the other, fortunately, being more rarely found, as, when once established, it is very difficult to eradicate. Mealy Bug must be destroyed in a similar way to Scale, as an insecticide strong enough to kill either, will, to say the least, be dangerous to use, in consequence of causing injury to the fronds of delicate texture. In winter, when the plants are at rest, the whole should be examined and cleaned, as stronger measures may then be adopted, by fumigation or the use of an insecticide, than would be safe after growth commences. At all times, a watch must be kept for the first appearance of insects, as proper means for destruction then applied are always more effective in their results.

FERONIA (mythological, after Feronia, a nymph who presided over the woods and groves, and was worshipped by the Romans as a goddess). ORD. *Rutaceæ*. A stove evergreen fruit-tree, allied to the Orange (*Citrus*). It thrives well in a mixture of rich loam and peat, with a little sand added. Increased, in spring or summer, by placing cuttings of ripe young shoots in sandy soil, under glass, in bottom heat.

FIG. 8 FLOWERING SPIKE OF FERRARIA UNDULATA

Feronia—*continued.*

F. elephantum. Elephant's Apple. *fl.* white, with reddish anthers; panicle small, axillary, or terminal. *fr.* large, about the size of an apple, with a greyish rind; pulpy part edible. *l.* impari-pinnate; leaflets five to seven, obovate, sessile, crenulated, shining. *h.* 30ft. Coromandel, 1804. (B. F. S. 121.)

FERRARIA (named after J. B. Ferrari, 1584-1653, an Italian botanist). ORD. *Irideæ*. A genus of half-a-dozen species of interesting dwarf bulbous plants, with curiously spotted evanescent blossoms, from the Cape of Good Hope. This genus belongs to the section *Morææ*; it has many-flowered spathes, the filaments united in a tube, and the petaloid stigmas fringed. In a warm, sunny situation, and if planted about 6in. deep, Ferrarias prove hardy. Increased by seeds and offsets. They rarely grow more than 6in. in height.

F. antherosa (large-anthered). A synonym of *F. Ferrariola.*

F. atrata (blackish). *fl.* dark reddish-purple, fringed with brownish-green. (L. B. C. 1356.)

F. divaricata (divaricate). *fl.* brown. May to July. *l.* linear, acute, glaucescent. Stem branched at top. 1825. (S. B. F. G. 192.)

F. Ferrariola (Ferrariola).* *fl.* greenish-brown. March to July. *l.* equitant, ensiform; lower narrow. Stem simple. 1800. SYN. *F. antherosa.* (B. M. 751.)

F. obtusifolia (obtuse-leaved). *fl.* brown. May to July. *l.* distichous, ensiform, obtuse, keeled on both sides. Stem erect, branched, many-flowered. 1825. (S. B. F. G. 148.)

F. uncinata (hooked). *fl.* brown; spathe two-flowered; segments of perianth involuted at apex. May to July. *l.* linear, striated, hooked at top. Stem branched, shorter than the leaves. 1825. (S. B. F. G. 161.)

F. undulata (waved).* *fl.* greenish-brown. March and April. *l.* equitant, ensiform, wavy; inner twice as narrow as the outer. Stem branched. 1755. See Fig. 8. (B. M. 144.)

FERRUGINOUS. Iron-coloured, rusty.

FERTILISATION BY INSECTS. It is only within comparatively recent years that the important part played by Insects in the Fertilisation of flowers, has been thoroughly realised. A goodly number of plants will be found, upon examination, to bear flowers manifestly adapted for Insect visitations; and observations will prove that in the cases where precautions are taken to prevent these, Fertilisation does not occur, although the flowers in question may be hermaphrodite. As a rule, flowers of gay colours, those possessing much scent or secreting nectar, are more or less dependent upon Insect agency. Most dicœcious plants, or even hermaphrodite ones, in the Fertilisation of which the wind is a necessary auxiliary, present peculiarities of structure which do not obtain in those which are now called "entomophilous;" they do not secrete nectar, the pollen is too dry to adhere to Insects, and the corolla is either absent, or possesses neither the colour, scent, nor nectar which attract them. Amongst hermaphrodite flowers which are homogamous—that is to say, those in which the stamens and stigma ripen together—there are some which, experiment has proved, are sterile with their own pollen, but fertile enough if furnished with pollen from the flowers of other plants of the same species. The scarlet-flowered *Linum grandiflorum* is, according to the observations of Darwin, a case in point. The same authority has shown conclusively enough, by a series of carefully conducted experiments, that, in the case of the common Primrose, more capsules and larger seeds are developed as the result of Cross-fertilisation than when Self-fertilisation obtains. Therefore, unless the aid of the cultivator be called into requisition, in some cases Insect visits are absolutely essential, and in others of considerable value, to the species.

FERULA (the old Latin name, perhaps from *ferio*, to strike; stems used as rods). Giant Fennel. Including the genera *Ferulago* and *Narthex*, which are sunk under *Ferula* by the authors of the "Genera Plantarum." ORD. *Umbelliferæ*. A genus of about forty species of splendid hardy herbaceous plants, natives of Southern Europe, Northern Africa, and Central and Western Asia. Umbels of many rays; lateral ones usually opposite or verticillate. Leaves supra-decompound; leaflets usually cleft into linear segments. Stems tall. Roots thick. They are of very simple cultivation in almost any ordinary garden soil; and form admirable plants for growing near water, on banks and herbaceous borders, where their deep green, elegant foliage is produced almost in midwinter. It is important to plant them in permanent situations. The two best species are, perhaps, *communis* and *tingitana*, but all the others below named are well worth growing.

Ferula—*continued.*

F. Assafœtida (Asæfœtida). *fl.* greenish-yellow; umbels stalked. July. *l.*, radical ones 1½ft. long, stalked; cauline ones broadly sheathing; both cut into oblong-lanceolate, obtuse segments, 1in. to 2in. long. *h.* 7ft. Persia, 1855.

F. asparagifolia (Asparagus-leaved).* *fl.* yellow. *l.*, radical ones (including the petiole) 1ft. to 2ft. long, broadly ovate in outline, quadripinnate, the divisions very narrow, linear, hairy; upper cauline leaves sheath-like; involucral ones numerous, oblong-lanceolate, acute, reflexed. *h.* 4ft. to 5ft. Asia Minor.

FIG. 9. FERULA COMMUNIS.

F. communis (common).* *fl.* yellow; central umbel nearly sessile; lateral ones male, pedunculate; involucre wanting. June. *l.* green; leaflets linear-setaceous, flaccid; sheaths of upper leaves very large. *h.* 8ft. to 12ft. Mediterranean region, 1597. A very noble herbaceous plant. See Fig. 9. (S. F. G. 279, under name of *F. nodiflora.*)

F. Ferulago (Ferulago). *fl.* yellow, in a large terminal umbel; leaves of involucre numerous, oblong-lanceolate, reflexed. June. *l.*, leaflets pinnatifid, divaricate; segments linear, cuspidate. Stem terete, striated. *h.* 6ft. to 8ft. Spain. (J. F. A. 5, under name of *F. nodiflora.*)

F. glauca (glaucous).* *fl.* yellow; central umbel pedunculate; lateral ones male, on longer peduncles; involucre wanting. June. *l.* glaucous beneath; leaflets linear, elongated, flat. Stem terete, branched. *h.* 6ft. to 8ft. South Europe, 1596.

F. persica (Persian). *fl.* yellow; involucre and involucels wanting. *l.*, leaflets rather remote or decurrently pinnate; segments linear-lanceolate, dilated and cut at the apex. Stem terete, glaucous. *h.* 3ft. to 6ft. Persia, 1782. (B. M. 2096.)

F. Sumbul (Sumbul). A newly imported species, with graceful habit, elegant fern-like foliage, and stately pyramidal paniculate inflorescences. *h.* 9ft. Turkestan, 1872. This species—remarkable for the fœtid, musky, and milky juice of its root—was introduced into Russia in 1835, as a substitute for musk, and a remedy for cholera; thence the drug reached Germany and England, where it was admitted into the Pharmacopœia in 1867. (B. M. 6196.)

F. tingitana (Tangiers).* *fl.* yellow; terminal umbels on short peduncles; lateral umbels few, male, on longer peduncles;

Ferula—*continued.*

FIG. 10. FERULA TINGITANA.

involucre wanting. June. *l.* shining; leaflets or segments oblong-lanceolate, deeply toothed; upper petiole large, sheathing. Stem terete, branched. *h.* 6ft. to 8ft. Northern Africa, 1680. See Fig. 10.

FERULAGO. Included under **Ferula** (which *see*).

FESCUE GRASS. *See* **Festuca.**

FESTUCA (the old Latin name, meaning originally a stem or straw). Fescue Grass. ORD. *Gramineæ.* A large genus, containing about eighty species, principally natives of Arctic, cold and temperate regions. Nine species are natives of Britain. They are chiefly agricultural grasses. Several are, however, very graceful, and deserving of cultivation. Panicles loose; spikelets oblong, more or less compressed. *F. glauca* and *F. nigrescens* are particularly neat and compact in growth, and are well adapted for borders. They are of the easiest culture in common garden soil. Propagated by seeds, or by divisions.

FEVERFEW. *See* **Pyrethrum Parthenium.**

FEVILLEA (named after Louis Feuillée, 1660-1732, a traveller and botanist). SYN. *Nhandiroba.* ORD. *Cucurbitaceæ.* A genus containing five or six species of climbing shrubs, natives of tropical America. *F. Moorei*, perhaps the only one in cultivation, is a rampant evergreen stove climber, thriving in a sandy loam. Propagated by cuttings, made of the young wood, in summer, and inserted in sandy loam, under a bell glass, in heat.

F. Moorei (Moore's). *fl.* (males only known) pale brick red; pedicel slender, jointed in the middle; corolla lobes orbicular, or

Fevillea—*continued.*

broader towards the rounded apex; margins undulate. *l.* alternate, membranous, 3in. to 5in. long, shining, broadly ovate, long acuminate, rounded at the base. Guiana (?). A slender, quite glabrous climber. (B. M. 6356.)

FIBRILLOSE. Covered with little strings or fibres.

FIBROUS. Composed of fibres.

FICARIA. This genus is now included under **Ranunculus** (which *see*).

FICOIDEÆ. A large natural order, containing about 450 species, principally distributed throughout tropical and sub-tropical regions. They are small shrubs, undershrubs, or herbs. Flowers terminal or axillary, solitary, or in cymes, often very beautiful, sometimes minute and inconspicuous. Leaves opposite or alternate, undivided, usually fleshy or thickened, flat, terete, or triangular. None of the genera are of much importance from an economic point of view; some of the species of *Tetragonia* are used as pot-herbs. The genus just named, and *Mesembryanthemum*, are the best known; indeed, the natural order is called *Mesembryanthemeæ* in some works.

FIG. 11. FICUS COOPERI (page 12).

FICUS (the old Latin name, akin to the Greek *sfukon* or *sukon*, a fig; the Fig-tree has nearly the same name in all the European languages). Fig-tree. ORD. *Urticaceæ*. An extensive genus of usually stove or greenhouse trees or shrubs. Flowers monœcious, inserted upon the interior surface of a hollow, globular or pear-shaped fleshy receptacle, in whose tip is an orifice closed with small scales; those in the upper part male, the rest female. Very ornamental plants, of easy culture. They are readily propagated by cuttings or eyes, having a leaf attached in the case of the evergreen species, inserted in a close frame inside a propagating house, in early spring.

Ficus—*continued.*

small pot. It succeeds well in a greenhouse, and also outside in summer. Any of the species of *Ficus* do well in sandy loam, with the addition of a little leaf soil, and only small pots, in comparison to the size of plant, need be used. Plenty of syringing, or occasional sponging, will keep the leaves clean, and almost any amount of water may be applied to the roots. The species which grow on walls are the best of inside plants that could be used for the purpose, as, once started, they soon cover a considerable space and always present a lively green appearance. For culture of *F. Carica*, *see* **Fig.**

FIG. 12. TERMINAL SHOOT OF FICUS EXSCULPTA.

F. elastica is one of the most ornamental and extensively-grown species, and a plant that withstands confinement in rooms better, perhaps, than any other. It is also well adapted for stove or greenhouse decoration, and for sub-tropical gardening in summer outside. Shoots 1ft. long, if furnished with leaves, soon root, and form useful plants much quicker than eyes, which, however, have the advantage of increasing a much larger quantity. Small specimens are most attractive when restricted to a single stem. These may be afterwards grown into tall branched plants if desired, by keeping them several years and pinching out the points. *F. Chauvieri* is a fine species that forms a large bush, even when grown in a comparatively

F. acuminata (sharp-pointed). *fl.*, perianth three-cleft or three-partite, with the segments lanceolate and acuminated. Receptacle solitary, axillary, globose, pendent, of a deep bright orange colour, somewhat mealy and tuberculated on the surface, and terminating a stalk longer than itself. *l.* 4in. or 5in. long, somewhat coriaceous, elliptical, petiolated, veiny, glabrous above, and full green, downy beneath, with the veins prominent. Stem (under cultivation in this country) 5ft. to 6ft. high. Silhet, 1833. (B. M. 3282.)

F. barbata (bearded).* *l.* dark green, cordate, about 3in. long; apex elongated; edges clothed with long brown hairs. East Indies, 1832. A handsome plant for covering the walls of stoves; it has a creeping and rooting habit, similar to Ivy.

F. benjamina. Benjamin-tree. Receptacles solitary, or in pairs, globular, about ¼in. in diameter when ripe. *l.* ovate, or ovate-oblong, acuminate, shortly stalked, 2in. to 4in. long, entire,

Ficus—*continued.*

thinly coriaceous, with numerous rather fine, parallel, primary veins. Tropical Asia, Australia. A large elegant greenhouse tree, with slender pendulous branches, quite glabrous.

F. Brassii (Brass's).* *l.* somewhat fiddle-shaped, rich deep green. Stems and petioles ferruginously tomentose. Sierra Leone. A free, erect-growing species, equally suited for stove, greenhouse, or sub-tropical purposes.

F. Carica (Carian).* Common Fig-tree. *l.* simple, alternate, stipulate, palmate and sub-trilobate, rough above, pubescent beneath. *h.* 15ft. to 30ft. Mediterranean region, &c., 1548. For culture, &c., *see* **Fig.**

F. Chauvieri (Chauvier's).* *l.* oval-obtuse, very dark shining green, with pale yellow veins, having one or more large marginal undulations. This is described as being a noble species, with a faultless habit, and, next to *F. elastica*, is the best for outside culture in summer.

F. comosa (tufted). Female florets pedicellate, growing amongst long, narrow, acuminate, chaffy, white scales; male florets trifid, the divisions more acute than in the female. Receptacles obovate-globose, small, the size of large peas, produced singly or more often in pairs, from the axils of the petioles on the terminal branchlets. *l.* very smooth and shining, dark green above, pale beneath, coriaceous and thickish, entire, with a sharp, thin, pellucid edge. Trunk rather slender, about 1ft. in diameter, soon dividing into numerous spreading, or even declining branches. Branches slender, bearing conglomerate masses of leaves towards their ends. *h.* 40ft. India. A very handsome greenhouse tree. (B. M. 3305.)

F. Cooperi (Cooper's).* *l.* dark green, ovate, 1ft. or more long, 3in. to 4in. wide. Probably Australia. A good ornamental-leaved plant for either stove or greenhouse decoration. See Fig. 11, page 10.

F. dealbata (whitened).* *l.* elliptic, about 1ft. long by 6in. broad, coriaceous, deep green above, and, from the presence of a thick coat of silky hairs beneath, the under side is of snowy whiteness, which is particularly conspicuous in the young unfolding leaves. Peru, 1867. A very distinct and beautiful greenhouse species. (I. H. 1870, 4.)

F. diversifolia (opposite-leaved).* *l.* leathery, rounded above, narrowed into the short stalk below, upper surface bright green, dotted with light brown specks; lower pale green. A compact grower, well adapted for general decorative purposes. Greenhouse. (G. C. 1881, xvi. 247.)

F. eburnea (ivory).* *l.* oblong-ovate, petiolate, about 15in. long, 9in. broad, bright shining green, with stout ivory-white midribs and principal veins. India, 1869. A fine free-growing greenhouse species.

F. elastica (elastic).* Indiarubber Plant. *l.* coriaceous, 6in. to 18in. long, and 3in. to 6in. broad; upper surface dark bright shining green, yellowish-green below. East Indies, 1815. This splendid plant is very largely grown, both for indoor decoration and for sub-tropical gardening. (G. C. 1874, ii. 358.)

F. e. foliis aureo-marginatis (gold-margined-leaved). A very effective variety with golden-edged leaves, especially in autumn, when it has become full-coloured. The yellow band is about 1in. broad, contrasting beautifully with the dark shining green of the centre. Greenhouse. There are also other variegated forms of less value.

F. exsculpta (cut-out).* *l.* shortly stalked, lanceolate in outline, sinuately lobed; lobes again sinuate so as to produce a prettily cut margin. South Sea Islands, 1879. A very handsome stove evergreen, the curious crenations giving the leaf the appearance of having been stamped or punched out. See Fig. 12, for which we are indebted to Mr. Wm. Bull.

F. glomerata (glomerate). *l.* thin, elliptic, acuminate, 6in. to 8in. long, 2in. broad, on long petioles. Stems terete, finely pubescent. Australia, 1869. A free-growing greenhouse species, of slender habit. SYN. *F. vesca.*

F. macrophylla (large-leaved).* Australian Banyan; Moreton Bay Fig. *l.* thin, coriaceous, glossy, ovate-oblong, entire, cordate at the base, 4in. to 10in. long, 3in. to 4in. broad; veins slightly elevated on both surfaces; petioles smooth, 1in. to 2in. long. Queensland and New South Wales, 1869. Greenhouse.

F. minima (smaller). *See* **F. stipulata.**

F. Parcelli (Parcell's).* *l.* oblong-acuminate, serrated, bright green, irregularly blotched with dark green and ivory-white. Polynesia, 1874. A very ornamental variegated stove plant. (F. d. S. 2273-4.)

F. religiosa (religious). Peepul. *l.* bright green, nearly cordate; apex elongated into a tail-like process. *h.* 25ft. East Indies, 1731. A handsome stove plant for decorative purposes, forming itself into a compact bush. (B. F. S. 314.)

F. repens (creeping). A synonym of *F. stipulata.*

F. Roxburghii (Roxburgh's). *fl.* green. *fr.* collected in bundles of eight to twelve near root, turnip-shaped, ribbed, villous, having umbilicus closed by numerous cordate imbricate scales. *l.* large, smooth, roundish-cordate, three-nerved, downy on the nerves beneath, sometimes repandly toothed. *h.* 20ft. Silhet, 1840. Greenhouse. See Fig. 13. (R. H. 1872, 385.)

F. rubiginosa (rusty-leaved). *fl.*, perianth three-parted; segments roundish-oval, concave. Receptacle greenish-brown, globose, with an obtuse umbo at the point, the surface granulated with small tubercles. *l.* numerous, handsome, 3in. to 4in. long, coriaceous, elliptical, quite entire, on petioles about 1in. long, obtuse at the point and at the base; when young, covered, especially on the under side, with a ferruginous down; the older ones are glabrous except on the nerves beneath. Branches spreading, numerous. New South Wales, 1827. A small stove tree. (B. M. 2939.)

Ficus—*continued.*

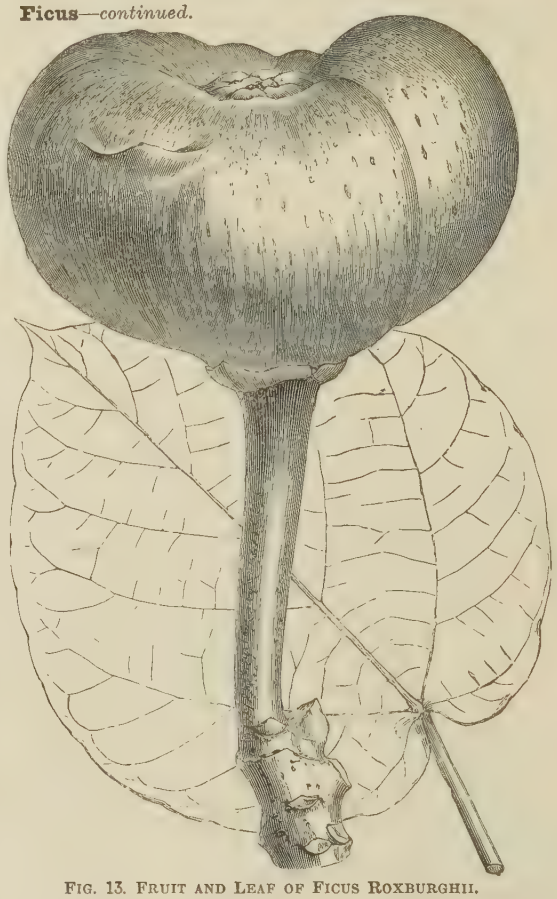


FIG. 13. FRUIT AND LEAF OF FICUS ROXBURGHII.

F. scandens (climbing). A synonym of *F. stipulata.*

F. stipulata (stipulate).* *l.* small, roundish, dark green. A very handsome little climber, attaching itself to walls, &c., like Ivy. It is half-hardy, and is frequently seen in greenhouses. China and Japan, 1721. SYNS. *F. repens* and *F. scandens.* (B. M. 6657.) *F. minima*, and other small-leaved forms, are only slender-twigged, extensively creeping states of barren young plants of *F. stipulata.*

F. Suringarii (Suringar's). *l.* large, cordate, serrate; upper surface rich dark green; main ribs deep red. Amboyna, 1866. An ornamental erect-growing stove species.

F. vesca (weak). A synonym of *F. glomerata.*

FIDDLE-SHAPED. Obovate, with one or two deep recesses on each side.

FIDDLE WOOD. *See* **Citharexylum.**

FIELDIA (named in honour of Baron Field, F.L.S., once Judge of the Supreme Court of New South Wales). ORD. *Gesneraceæ.* An ornamental climbing, radicant, greenhouse evergreen shrub, thriving well in a compost of peat and loam, to which a little sand and small pieces of charcoal have been added. Increased by cuttings of firm side shoots, left intact, and planted in sandy soil, under a glass.

F. australis (Southern). *fl.* white, pendulous; corolla tubular, ventricose; peduncles axillary, solitary, one-flowered. July. *l.* simple, opposite, remote, elliptic, coarsely serrated, acute at both ends. New South Wales, 1826. (B.M. 5089.)

FIG (*Ficus Carica*). The Fig, as a fruit-producing tree, has been cultivated from remote antiquity. To say nothing of America and the countries of the Southern hemisphere, the cultivation of the Fig must be very ancient, and is now general from the islands of the North Atlantic eastward, through the warm temperate and sub-tropical regions eastward to China, where, on the authority of Dr. Bretschneider, it was carried on, at all events, as early as the latter part of the fourteenth century. According to various authorities, it is a native of the Mediterranean region, Syria, Eastern Persia, to Afghanistan. It has become naturalised in South-west France, &c. The exact date of its introduction into Britain remains in obscurity; and, like the Vine, in all probability, it disappeared from Britain for a time. According to Pliny, it was largely cultivated by the Romans, who were possessed of a number of different sorts prior to the Christian era. The re-introduction of the Fig is said to have taken place in 1525, when Cardinal Pole brought several trees from Italy, and planted them in the gardens of the Archbishop's Palace at Lambeth. Another celebrated tree was introduced from Aleppo, in 1648, by Dr. Pocock, the eminent traveller,

FIG. 14. FRUITING BRANCH OF FIG.

and placed in the garden of the Regius Professor of Hebrew, at Christ Church, Oxford. In 1809, it was considerably damaged by a fire, and the large trunk decayed and was removed. A number of fresh branches, however, sprang from the root, and, in 1819, those in the centre of the tree were 21ft. high. It is remarkable that a tree with wood of such a soft nature should live to the age of even several centuries in climates suitable to its growth. In Britain, when unprotected, the Fig is sometimes killed to the ground by very severe frosts, but becomes re-established by the production of suckers from the roots; at other times, the points of the shoots are destroyed by frost less severe. The fresh fruit does not find general favour in this country, partly because successful culture involves the necessity of heated glass structures in most districts, and the very limited time it remains in good condition when ripe. The skin is also extremely tender, and thus the fruits are among the worst for packing to travel any distance. In Sussex and other mild districts along the South Coast, the tree will grow as a standard, but it will not succeed as such further inland. The generally necessary situation is a wall with a south or south-west aspect; but in places where the summers are hot, and very sharp frosts of rare occurrence, Fig-trees may be grown as espaliers, being easily protected in winter

Fig—*continued.*

as much as would be required. The Fig possesses the extraordinary property of producing two, and, in some climates, under most favourable conditions, three crops in a year. The fruit supply being thus extended over such a lengthened period, becomes to the people of the East, where the trees are much grown, an important source of food, both in a fresh and in a dried state. The annual importation to this country alone of some hundreds of tons of dried Figs, is an indication of the quantity cultivated, and the crops secured. The same article also forms one of considerable commerce in Italy, Spain, Provence, and in some parts of France.

As it is not generally understood, it may be interesting to state here that the flowers of the Fig are unisexual, and produced in large quantities inside a fleshy receptacle that is closely united and almost closed at the summit. The female flowers are most numerous, and situated on the bottom and greater part of the inside of the receptacle. On these becoming fertilised—a condition not absolutely essential with all for the ripening of the fruit—each becomes a seed, which is surrounded with pulp, and these, with the receptacle, form the fruit as shown in Fig. 14. An idea of the enormous quantity of seeds contained in a fruit may be obtained by examining an imported dried specimen.

PROPAGATION. This is easily effected in various ways — by seed, cuttings, layers, and suckers, also by grafting.

Seed. Propagation by this method is not much practised, but is sometimes adopted with a view to raising, from the sorts which succeed best in this country, other new and, perhaps, hardier varieties than those introduced from warmer climates. The seed, if required, should be carefully cleaned from the pulp of some of the finest and ripest fruits, and kept till January, when it should be sown in heat, and the young plants afterwards grown on as rapidly as possible, as on this mainly depends the time taken in obtaining the first fruit.

Cuttings, &c. The best cuttings are short-jointed growths of the previous year, from 6in. to 9in. in length; if with a heel, so much the better. They may be inserted in pots, and placed in bottom heat, in early spring Some prefer selecting them in autumn, and laying the ends in the ground all winter, providing protection for the part exposed. Whether treated in this way or taken directly from the plants and inserted, they generally root freely, and, if grown on in heat, soon form good plants. Propagation by layers is a quick method of obtaining fruiting plants in a limited time, as good-sized branches with fruiting wood may be successfully rooted in one season, and may then be detached from the parent. Suckers are freely produced where allowed, and may also be grown into plants; but, on account of the wood in these being invariably very soft, they are inferior to those grown either from cuttings or layers. Grafting is practicable if desired, the scions being cut in autumn, laid in the ground all winter, and inserted, soon after the stock commences its growth, in spring. Figs being so easily increased by the other means above named, this method is but little adopted.

CULTIVATION. The Fig will grow in almost any soil; but if too rich, the chances are that a great production of wood and not much fruit will be the result. The best crops outside are usually secured from trees planted in a border composed of loam and brick rubbish, by the side of a hard walk, into which the roots can scarcely penetrate. If this is not practicable, they must be occasionally restricted by root-pruning, or by some other means, such as a narrow wall division under-

Fig—*continued.*

ground. Good drainage is essential, and chalk is one of the best things to use where it can be procured. An open warm position should be selected, as this, and root restriction, are important points towards encouraging the production of short-jointed, fruit-bearing wood. The climate of this country will not admit of more than one crop being ripened each year outside, and this is by no means a certain one in the majority of instances. During severe weather, the stem and branches require protection. This is afforded in various ways, some unnailing and collecting the latter in bundles, and covering with a thick coat of straw or mats. Spruce branches, fern, thatched hurdles, and canvas, may all be made to answer the same purpose. » Neither is necessary, as a rule, along the South Coast, and should not be applied in other places, unless in severe weather, and then they should be removed gradually in spring.

Mode of Bearing, Pruning, &c. The fruits are produced, one or two together, in the axils of the leaves. They are formed along the branch, as growth proceeds, and, with but few exceptions, come to maturity, if at all, on new or recently ripened wood. It will thus be understood that the points of the shoots must, as much as possible, be protected from frost, and preserved when pruning. Growth seldom begins outside before May; the embryo Figs on the wood of the previous year, and new shoots for the next year, starting almost simultaneously. Fruits will also be formed along the latter, and these constitute the second crop, that ripens in some parts of the South of Europe, but in this country the summers are too short. Any fruits that are sufficiently advanced in early autumn to show the shape of the Fig, are of no use; and if these are carefully pinched off, other later ones may be formed by the side, that remain dormant with those produced nearer the points, as before explained, until the tree starts the following year. Pruning is not much required, except to keep the branches thinned; and a good deal of this, also pinching of the strongest shoots, should be seen to in summer, so as to leave only those required for fruiting. Too much pruning frequently results in the increase of soft, unproductive wood, especially if the roots are in anything like rich soil. New shoots should be encouraged from parts near the stem, where they are required to replace any that become bare or exceed their limits. Either the horizontal or the fan system of training is that usually adopted as being best suited for trees having to be grown on walls, or as espaliers. Suckers proceed in large quantities from the roots of permanent trees; these are sometimes trained about 15in. apart, and in course of time allowed to fruit. This plan is not to be recommended, as better wood may be obtained from healthy branches.

Forcing. The Fig will bear, and at all times requires, a higher temperature to start it into growth than any other fruit-trees usually forced. In gardens where a house is not specially devoted to their culture, some plants may be successfully fruited in pots, and frequently good crops are thus obtained. The supply may also be continued for a much longer period from these, by introducing a few at a time for forcing, and securing a crop from the wood of the previous year. A lean-to house admits of trees being grown both on a trellis in front, and on the back wall, the front trees being stopped so as to admit sun and light to those at the back. The roots of strong-growing varieties should be restricted by being pruned or inclosed with a narrow wall, as recommended for outside culture. The border is best made of loamy soil with a little crushed bone and mortar or charred rubbish added, this soil being also better suited for pot culture than one with more manure. When any repotting is required, it should be done when the plants are at rest; and if already in large pots, the soil and roots may be reduced, and the plants

Fig—*continued.*

returned to a similar size. A night temperature of 50deg., and a rise by day, in mild weather, to 60deg. or 65deg., with plenty of moisture, will not be too high for starting; and as soon as the leaves are growing, and the days get longer, these figures may gradually be raised 10deg. higher. Large quantities of water are necessary in summer, and it should not be applied at a lower temperature than that of the soil in which the roots are growing. Plenty of syringing with warm water should also be practised until the fruit commences ripening, when a drier atmosphere tends to heighten the flavour. Under glass, the Fig ripens two crops if the trees are started early, the first being on the wood of the previous season, and the second on that of the current year. The new shoots should be pinched when about 9in. long, to arrest the progress of the sap, and encourage the formation and production of fruit from the axils of the young leaves. Disbudding may be practised with great advantage, as a large number of shoots are formed that cannot be allowed sufficient space to develop. Figs forced in pots should be plunged, if possible, in tan or in a bed of fermenting material, with a bottom-heat temperature of about 65deg. Liquid manure, when the fruits are swelling, may be applied to these twice or thrice a week, unless the plants are growing too strongly without. As the fruit and leaves ripen, more air should be given and water gradually withheld. When the leaves are all dropped from trees, either planted out or in pots, they must be kept quite cool, and the soil only a little moist by occasional waterings, until required to start for the next season.

Sorts. Varieties cultivated in countries where Figs are grown in quantities outside, are very numerous, but comparatively few of them have been introduced to our gardens. The following selection includes most of the best, and is, practically, large enough for all purposes. NEGRO LARGO and OSBORN'S PROLIFIC are good varieties for culture in large pots. The former must be rather severely restricted in space, if planted out, on account of its vigorous growth. BROWN TURKEY is, perhaps, the best of all for forcing, as it seldom fails to fruit abundantly under proper cultivation, and does not grow too strongly, even when the roots are not in a limited space; it is also one of the best for outside culture where Figs succeed. BRUNSWICK and WHITE MARSEILLES are two of the hardiest varieties in cultivation.

Agen. Fruit of medium size, roundish, with flattened crown; skin green, covered with blue bloom; flesh dark red, thick and syrupy. Ripens late.

FIG. 15. FIGS, BLACK BOURJASSOTTE.

Black Bourjassotte. Fruit medium, with short stalk; skin black, covered with a thick bloom; flesh deep red, thick and delicious. See Fig. 15.

Black Genoa. Fruit oblong, large; skin dark purple, with thick bloom; flesh yellow, sweet and juicy. A hardy sort, said to be much grown in Provence.

Black Ischia, or **Early Forcing.** Fruit medium, roundish-obovate; skin nearly black when ripe; flesh deep red, richly flavoured. Early and prolific.

Brown Turkey. Fruit large, short, pear-shaped, with a thick stalk; skin brown, with sometimes a purplish tinge; flesh tinged red in the middle, rich and sugary. One of the best sorts grown either for forcing or outside culture. It has numerous synonyms, including Blue Burgundy, Brown Naples, Common Purple, Italian, Large Blue, Lee's Perpetual, Purple, &c.

Brunswick. Fruit pear-shaped, very large, with short thick stalk; skin greenish-yellow, tinged with brown; flesh reddish near the middle, yellowish outside, rich and sweet. A distinct variety,

Fig—*continued.*

hardier than most others, and not suitable for forcing. It has large deeply-divided leaves.

Castle Kennedy. Fruit very large; skin greenish-yellow; flesh whitish, stained with red near the eye. Early and very prolific, suitable for walls.

Col di Signora Bianca. Fruit medium, pear-shaped, with a long neck; skin thick, yellowish-white when ripe; flesh dark blood-red, syrupy and delicious. This is considered one of the finest Figs in cultivation.

Early Violet. Fruit small, roundish; skin brownish-red, with blue bloom; flesh red, and of good flavour. A small-fruited but hardy and very prolific variety.

Grizzly Bourjassotte. Fruit round, much flattened, with a short neck; skin reddish-brown, with a thin bloom; flesh blood-red, thick, and highly flavoured.

Grosse Monstreuse de Lipari. Fruit very large and broad, flattened at the apex; skin chestnut-brown, covered with a thick bloom; flesh red, thick and juicy. A large handsome Fig, that grows and bears freely.

Negro Largo. Fruit pear-shaped, ribbed, very large and long; skin black; flesh pale red, tender, juicy, and richly flavoured. A variety of good habit when restricted at the root; one of the best for pot culture.

FIG. 16. FIG OSBORN'S PROLIFIC.

Osborn's Prolific. Fruit roundish, turbinate, with a very long neck; skin dark mahogany, shading off to pale brown towards the neck, which is green; surface of fruit thickly dotted with greyish spots; flesh milky-white, of exquisite flavour. An excellent Fig, introduced by Messrs. Osborn, of Fulham, in 1879. It is an abundant bearer, and well adapted for culture in pots. (Dr. Hogg's "Fruit Manual.") See Fig. 16.

Panachée. Fruit roundish, with a short neck; skin yellow, beautifully striped with bright green; flesh pale red inside, thick and syrupy. A handsome distinct fruit.

White Ischia. Fruit small; skin greenish-yellow, thin and delicate; flesh dark red, juicy, sweet and rich. Small-growing and a great bearer, well adapted for pot culture.

White Marseilles. Fruit large, almost round, and slightly ribbed, with a short thick neck; skin thin, pale green, nearly white when ripe; flesh almost transparent, sweet, and rich. One of the hardiest varieties, and also suitable for forcing. It has several synonyms, including Figue Blanche, Ford's Seedling, White Genoa, White Naples, &c.

FIG MARIGOLD. *See* **Mesembryanthemum.**

FIG-TREE. *See* **Ficus.**

FIGWORT. *See* **Scrophularia.**

FILAMENTOSE. Thready.

FILBERT. Among cultivated nuts, Filberts are usually distinguished by the extension of the husk beyond the point of the nut inclosed (see Fig. 17). In

Filbert—*continued.*

early spring, the male or pollen-bearing catkins (see Fig. 18, *a*) appear considerably in advance of the female

FIG. 17. FRUITING BRANCHLET OF FILBERT, the Husk being the much-enlarged Bract and Bracteole.

FIG. 18. LEAFLESS TWIG OF FILBERT, showing (*a*) Pendulous Male Catkins and (*b*) the Sessile Female Flowers.

flowers (see Fig. 18, *b*). The preservation of the former, greater or less in quantity, is essential for securing fertilisation. For culture and list of varieties, *see* **Corylus.**

FILICES. One of the most important orders of acotyledons or cryptogams. Perennial (very rarely annual) herbs, sometimes shrubby or arborescent, with fibrous roots or creeping rootstocks. Leaves (fronds) tufted or alternate on the rootstock, simple, pinnatifid,

Filices—*continued.*

or one to four-pinnate, usually circinate in vernation; petiole (stipes) sometimes jointed at the base and rachis, grooved on the upper surface. Fructification of microscopic spores, contained in usually minute capsules that are collected in masses (sori) on the under surface or edge of the frond, or rarely on separate fronds or parts of the frond, and are naked, or covered with an involucre formed of or upon the margin or back of the frond. Capsules membranous, sessile or stalked, often mixed with jointed club-shaped hairs (imperfect capsules). Spores usually obtusely tetrahedral. There are about seventy-five genera and about 2,500 species. The following genera contain the largest number of species: *Acrostichum*, *Adiantum*, *Aspidium*, *Asplenium*, *Nephrodium*, *Polypodium*, and *Pteris*.

FILIFORM. Slender; resembling a thread in form.

FILMY FERNS. *See* **Ferns.**

FIMBRIARIA. This genus is now included under **Schwannia** (which *see*).

FIMBRIATE. Fringed.

FIR. A general name for the conifers belonging to the genera *Abies*, *Larix*, *Picea*, *Pinus*, &c.

FISTULAR, FISTULOUS. Hollow, like a pipe.

FITTONIA (named in honour of E. and S. M. Fitton, authors of "Conversations on Botany"). ORD. *Acanthaceæ*. A genus containing only a couple of species of stove evergreen trailing perennials, with very brilliantly marked leaves; both natives of Peru. They are of easy culture, and thrive well in a compost of peat, loam, and silver sand; liberal supplies of water and a shady situation are necessary elements to successful cultivation. Increased by cuttings of half-ripened shoots, planted in sandy loam, in bottom heat; also by divisions of the plant. As ornaments for a Wardian case, Fittonias are unequalled; and when grown as pyramids, they form beautiful objects in the stove. For planting upon the surface of the pots or tubs in which palms or other large specimens are growing, they are very useful, and also for forming narrow borders as edges to the walks in heated structures.

F. gigantea (gigantic).* *fl.* pale red, in a terminal four-sided spike, with large bracts. *l.* broadly ovate, sub-cordate, veined with carmine-red. *h.* 1½ft. Habit branching, erect, sub-shrubby. 1869. See Fig. 19. (R. G. 629.)

F. rubronervum (red-nerved). A synonym of *F. Verschaffeltii*.

F. rubrovenosum (red-veined). A synonym of *F. Verschaffeltii*.

F. Verschaffeltii (Verschaffelt's).* *l.* larger than those of *F. gigantea*, dark green; midrib and veins deep red. An elegant

FIG. 19. FITTONIA GIGANTEA.

FISCHERIA (named after Dr. Fischer, of St. Petersburgh). ORD. *Asclepiadeæ*. A genus comprising about twelve species of stove twining shrubs or sub-shrubs, natives of tropical and sub-tropical America. Flowers white or dull red; cymes umbelliform or shortly racemose. Leaves opposite. In all probability, the two species described below are the only ones yet in cultivation. They thrive in a peat and loam compost. Propagated by cuttings, inserted in light open soil, in heat. This genus is often confused with *Gonolobus*.

F. hispida (hairy). *fl.* brown, umbellate; corolla coriaceous, tubercled inside at base. July. *l.* cordate-ovate, acute. Stem, petioles, and nerves of leaves hispid. *h.* 4ft. Brazil, 1837. (B. M. 3786, under name of *Gonolobus hispidus*.)

F. Martianus (Martius's). *fl.* white, green; umbels many-flowered, on long peduncles; lobes of corona fleshy and rounded. May and June. *l.* oblong-cordate. *h.* 30ft. Brazil, 1845. (B. M. 4472, under name of *Gonolobus Martianus*.)

FISH-BONE THISTLE. *See* **Chamæpeuce Casabonæ.**

FITZROYA (named after Capt. R. Fitzroy, R.N., commander of a surveying expedition; died 1855). ORD. *Coniferæ*. A genus containing a couple of species of dwarf evergreen trees, with imbricated scale-like leaves; one (from Patagonia) is sufficiently hardy to withstand our winters in exceptionally favoured spots. They do well in almost any garden soil, and are readily propagated by means of seeds, or by cuttings of half-ripened branchlets. *F. Archeri* makes an interesting and handsome cool conservatory plant.

F. Archeri (Archer's). *fl.* dioecious, the amenta terminal. *male cones* erect, one to two lines long, scarcely thicker than the branchlets with their leaves. *young female cones* purplish in the

Fitzroya—*continued.*

dried state, about one line long and broad. *l.* closely imbricate, but strictly opposite and decussate, very obtuse, thick, and keeled. Tasmania. An erect, densely branched shrub. SYN. *Diselma Archeri.*

F. patagonica (Patagonian). *fl.* monœcious, small, consisting of nine scales in three whorls, the upper and lower of which are barren. *l.* small, ovate-oblong, flat, obtuse, sessile, two to four-rowed. Branches slender, spreading, incurved at the extremities. Tree. Patagonia. (B. M. 4616.)

FLABELLIFORM. Plaited like a fan.

FLACCID. Feeble, weak.

FLACOURTIA (named after Etienne de Flacourt, 1607-1661, a Director of the French East India Company). ORD. *Bixineæ.* A genus comprising about a dozen species of fruit-bearing, often thorny, stove trees or shrubs, from the warmer regions of Asia and Africa. Stamens densely crowded upon the hemispherical receptacle; the sepals whitish, and the stamens and anthers yellow. Fruit baccate, indehiscent. Leaves shortly stalked, dentate. The species are rarely seen in cultivation.

FLACOURTIEÆ. A tribe of *Bixineæ.*

FLAGELLIFORM. Long, tapering, and supple, like the thong of a whip.

FLAGELLUM. A runner, like that of the Strawberry; also a thin twig or small branch.

FLAME FLOWER. *See* **Kniphofia aloides.**

FLAT-BODY MOTH, COMMON (*Depressaria cicutella*). In this moth, like the rest of the genus, the body seems depressed, hence the common name. The fore wings are pale ochreous-reddish, irregularly freckled with brown and black specks; a pale mark runs from the base along the front edge, and two or three white dots, in black rings, are seen towards the middle; the whole having a glossy appearance. The hind wings are shining, but more grey, and without markings. The common Flat-body Moth produces two, or perhaps more, broods in a year. The caterpillars are found in June, and again in September, and the moths in August and November; the latter live in a dormant state through the winter, and re-appear in the spring. Two or three species of this genus, very similar in appearance and habit, infest the leaves, flowers, and seeds of Carrot crops, sometimes doing considerable damage. The other kinds are *D. daucella* and *D. depressella.* *See* **Carrot Blossom Moth** and **Purple Carrot-seed Moth.**

Remedies. The larvæ draw the leaves or flower-heads together by means of silken threads, which make their domicile very conspicuous. These may be gathered and destroyed; but as the caterpillar is likely to wriggle out and drop, by means of a silken thread, at the moment the plant is touched, some receptacle should be placed under the curled part before attempting to pluck it off. Solitary wasps, and insectivorous birds, are very useful in clearing away these small grubs.

FLAVERIA (from *flavus*, yellow; in reference to the plants being used in Chili to dye that colour). ORD. *Compositæ.* A genus comprising about seven species of herbaceous plants. Flower-heads yellow. Leaves opposite, narrow, entire or dentate. Probably the only species cultivated in England is the one described below. It is a greenhouse herbaceous biennial, thriving in sandy loam. Propagated by seeds, sown in heat.

F. contrayerba (vermifuge). *fl.-heads* yellow, terminal. July to September. *l.* somewhat stalked, lanceolate, three-nerved, mucronate-serrate. *h.* 1½ft. Peru, 1794. (B. M. 2400.)

FLAVESCENT. A pure pale yellow.

FLAX. *See* **Linum.**

FLAX, NEW ZEALAND. *See* **Phormium tenax.**

FLAXWORTS. A name for the order *Linaceæ.*

FLEABANE. *See* **Conyza.**

FLEA BEETLE. *See* **Turnip Fly.**

FLEXUOUS. Having a bent or undulating direction; zigzag.

FLINDERSIA (named after Capt. M. Flinders, R.N., 1780-1814, who explored the coast of Australia, accompanied by the famous botanist, Robert Brown). ORD. *Meliaceæ.* A genus of about four species, natives of tropical and sub-tropical Australia and the Moluccas. They are stove or greenhouse evergreen trees or shrubs, succeeding in a compost of loam and peat. Cuttings, with leaves intact, will root in sand, under a glass.

F. australis (Southern). *fl.* white, small, numerous, panicled. May. *l.* impari-pinnate; leaflets one to three pairs, full of pellucid dots, as in the Orange. *h.* 60ft. Queensland, 1823. The wood is useful for various domestic purposes, and is said to be not much inferior to mahogany. Greenhouse.

FLOCCOSE. Covered with close woolly hairs, which fall away in little tufts.

FLORAL. Of or belonging to a flower; near a flower.

FLORAL ENVELOPES. The calyx and corolla, which envelop the inner or reproductive parts of a flower, are so called.

FLORETS. Little flowers; chiefly applied to composites and grasses.

FLORIFEROUS. Bearing flowers.

FLORISTS' FLOWERS. This term is applied to a very large section of mostly greenhouse and hardy plants, abounding in varieties and garden forms that have originally descended from a limited number of species of each of the numerous genera included. The Florist is one who specially devotes his attention to the improvement of such plants as admit of it, either by cultivation, careful selection, or systematic hybridisation. The superiority, both in habit of plant, and form and variety in colour of flowers, is apparent in almost every subject that has been taken in hand. In many cases, where it is thought perfection has been well-nigh reached, a new break appears in some way, and thus fresh material is given the Florist on which to effect an improvement. The number of plants included amongst Florists' Flowers is continually extending, as, apart from increasing and perpetuating new varieties of a superior type, other genera, that have hitherto been neglected, are brought under the same influence, with a view of eventually obtaining a similar result. Perfection in habit and in form of flower, with distinct colouring, are points always to be aimed at, and only those flowers which are best in these respects should be used for seeding purposes. It is invariably necessary to perpetuate varieties of Florists' Flowers by cuttings or offsets, as the case may be, seeds having a tendency to produce plants of a mixed and inferior quality to those from which they were collected. The Florist's standard for quality and good culture is now of a high character with many plants, and is beyond the reach of the majority of cultivators. The advantages of the improvements effected are, however, available for all in the select varieties annually distributed, or those in general cultivation. The Auricula, Carnation, Chrysanthemum, Dahlia, Fuchsia, Gladiolus, Hyacinth, Pelargonium, Tulip, &c., may be cited as some of the most popular and best-known examples, each and all exhibiting evidence of the success attending the Florist's work.

FLOWER. In phanerogamic plants, the Flower is a collection of several whorls (usually four) of modified leaves. The calyx is the outer whorl, the corolla the second, and the stamens and pistil the third and fourth.

FLOWER BORDERS. *See* **Borders, Flower.**

FLOWER BUDS. *See* **Buds, Flower.**

FLOWER-DE-LUCE. An old English name for the common species of **Iris** (which *see*).

FLOWER FENCE. *See* **Poinciana.**

FLOWER GARDEN. *See* **Garden.**

FLOWERING ASH. *See* **Fraxinus Ornus.**

FLOWERING RUSH. *See* **Butomus umbellatus.**

FLOWER OF JOVE. *See* **Agrostemma flos-Jovis.**

FLUEGGEA. *See* **Ophiopogon.**

FLUES. The system of fixing Flues for heating purposes in glass structures is now become nearly obsolete, the better and more effective mode of heating by hot water being almost exclusively adopted. In the earlier days of gardening, the use of Flues was general, and even now many remain and continue to answer their purpose exceedingly well, both for fruit and flower cultivation. Flues may be constructed of bricks, and covered with thick flat tiles or slates, placing a cross piece of sheet iron under each joint; or large pipes may be employed with good results, if properly connected. Fire bricks should be used near the furnace, and the Flue proceed from here round the front part of the house first, returning at the back, or terminating in a chimney at the end, according to the amount of heat required. Corners should be turned by a curve, to allow the heated air and gases to pass more freely, and consequently prevent cracking of the joints. The whole of the heat transmitted to the house must pass through the material used in the construction of the Flue; and all holes or cracks should be kept stopped, to prevent the escape of smoke and injurious gases. It is very important that Flues be kept cleaned out, as a coat of soot prevents the absorption and free passage of heat, and is also an obstruction to the draught. The furnace is best near one end of the house. It should be placed about 2ft. below any part of the Flue, and a gradual ascent allowed the latter until the chimney is reached.

FLUGGEA (named in honour of John Flugge, a German cryptogamic botanist). ORD. *Euphorbiaceæ*. A genus comprising several species of much-branched smooth shrubs, found in most tropical countries of the Eastern hemisphere. Flowers green, minute, and disposed in fascicles or cymes in the axils of the leaves. Berry about the size of a pea, or smaller. Leaves entire, obovate or ovate. In all probability, the species here described is the only one yet introduced. It succeeds in a rich mould and in a moist stove. Propagated by cuttings.

F. leucopyrus (white-fruited). *fl.* apetalous. Berries white, edible. *l.* alternate, orbicular, ovate, entire, smooth; spines 2in. to 3in. long, very strong and numerous, whitish. East Indies, 1825.

FLY HONEYSUCKLE. *See* **Lonicera Xylosteum.**

FLY ORCHIS. *See* **Ophrys muscifera.**

FŒNICULUM (the old Latin name). ORD. *Umbelliferæ*. A genus containing three or four species of hardy biennial or perennial, often tall herbs. Flowers yellow, in compound umbels, without involucres; petals entire, inflected at the top, but not pointed. Fruit oval. Leaves pinnate, decompound, finely dissected. For culture, *see* **Fennel.**

F. dulce (sweet).* This is considered by some authorities to be but a variety of *F. vulgare*. It differs, however, in the plant being smaller; in the stem being compressed, not round, at the base; in the smaller number of rays to the umbel, &c. It is cultivated in this country as a pot herb. Biennial.

F. officinale (officinal). A synonym of *F. vulgare*.

F. vulgare (common).* Common Fennel. *fl.* yellow, in rather large umbels. Late summer and autumn. *l.* three or four times pinnate, with very narrow, linear or subulate segments. Stems erect, branched. South Europe; occurring in many parts of Britain. Perennial. SYN. *F. officinale*. (Sy. En. B. 601.)

FŒTIDIA (from *fœtidus*, stinking; in allusion to the smell of the wood). ORD. *Myrtaceæ*. A genus containing three species (perhaps these are merely varieties of one) of glabrous trees, having a tough, bitter bark. Peduncles axillary, solitary, one-flowered. Leaves alternate, elliptic or oblong, entire, penninerved. *F. mauritiana* is an ornamental greenhouse evergreen tree, allied to **Gustavia** (which *see* for culture).

Fœtidia—*continued.*

F. mauritiana (Mauritius). *fl.* solitary; peduncles in the axils of the upper leaves; petals wanting; tube of calyx tetragonal and hemispherical; lobes valvate in æstivation, permanent, at length reflexed. *l.* alternate, crowded on the branches, sessile, oval, entire, obtuse. *h.* 15ft. to 20ft. Mauritius, 1827.

FOLIACEOUS. Having the form of leaves.

FOLIOLATE. When a leaf is divided into leaflets, it is called One, Two, Three, Ten, or Twelve-foliolate, according to the number of leaflets.

FOLIOLE. A leaflet; the secondary divisions of a compound leaf.

FOLLICLE. A kind of fruit consisting of a single carpel, dehiscing by the ventral suture only. See Fig. 20.

FIG. 20. FOLLICLE OF DELPHINIUM.

FONTANESIA (named in honour of M. René Louiche Desfontaines, 1750-1833, author of "Flora Atlantica," and several other works). ORD. *Oleaceæ*. An ornamental, hardy sub-evergreen shrub, resembling the common Privet, but with rough bark, and graceful, slender, drooping branches. It thrives in ordinary soil. Increased by layers; by cuttings, planted under a hand glass, in autumn; or by grafting on the Privet. In all probability, the two plants here described are but forms of one species.

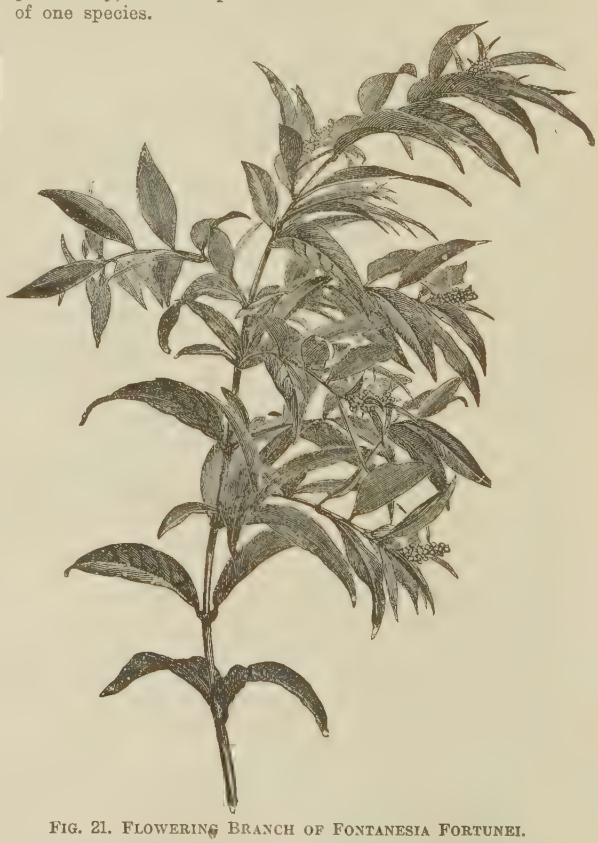


FIG. 21. FLOWERING BRANCH OF FONTANESIA FORTUNEI.

F. Fortunei (Fortune's). *fl.* creamy-yellow, in axillary and terminal panicles. *l.* lanceolate, entire, long-acuminated, glossy green above, paler beneath. China. See Fig. 21. (R. H. 1869, 43.)

F. phillyræoides (Phillyrea-like). *fl.* creamy-yellow, in axillary racemes. August. *l.* lanceolate, acute at both ends. *h.* 10ft. to 14ft. Syria, 1787. This species has the habit of *Phillyrea media*. (L. B. C. 1308.)

FOOTSTALK. The stalk of a leaf.

FORCING. This is one of the most important operations in the whole routine of gardening, and one that requires the greatest care in practice for obtaining successful results. It has to be mainly conducted throughout the winter and early spring, when outside temperatures are extremely variable, and when the amount of sunshine and consequent light obtained is, at best, but very limited. Forced flowers, fruits, and vegetables, are annually in demand, and all have to be procured under conditions that are generally unnatural to the plants at the time, in consequence of an insufficient season of rest being allowed them. Fruit-trees carefully forced in successive seasons, and properly ripened after the fruit is gathered, finish their growth, and begin a season of rest, earlier than those allowed to grow more in accordance with their natural habit. These start the more readily, in consequence, when artificial heat is applied. Many flowering plants are so far injured by early Forcing, as to be unavailable for the purpose the following year; but they may generally be recruited in health, in the course of two seasons, by planting out, and, in the meantime, using others that have been prepared in a similar way. The preparation of plants for Forcing, or selection of those only which are thoroughly ripened, is always one of the most important points. A fruit-tree, or flowering plant, thus treated will have its embryo flowers formed inside the bud-scales, and ready for expanding when the necessary heat and moisture are given. In the early stages of Forcing operations, heat should be applied as gradually as possible, beginning with a little warmer, closer atmosphere than that allowed during the resting period. A temperature not exceeding 50deg. to 55deg. by artificial heat will suit a large number of plants to start with, but these figures must not be taken as applying to all alike—they would be too high. Most plants subjected to Forcing will bear more heat after the buds swell and commence growing, than they will previously. The value of sunshine and light cannot be over-estimated; consequently, both should be admitted to the fullest extent in winter, when the sun will seldom be strong enough to injure the tenderest foliage. It is not advisable to apply heat, when the weather is dull, to maintain a temperature equal to that supplied naturally on brighter days, as the result would be an encouragement of weak, attenuated growths, which, with a return of sun, or an admission of air, would immediately droop. Very early Forcing renders many plants and vegetables useless afterwards, and this necessitates an annual supply being raised for the purpose. Almost any positions in heated structures may be utilised for such, as, once the crop is secured, in the case of either flowers or vegetables, the roots may be destroyed, and their place taken by others. Vines, and fruit or other permanent trees, are of much more consequence; hence, the greatest care is necessary, in Forcing, not only to conduct it so as to gain a crop the following season, but also to avoid doing anything that may prove injurious to the well-being of the trees afterwards. A ridge of fermenting material, composed of fresh stable litter and plenty of leaves, is frequently used, with good results, for starting early Vines or Peach-trees. It requires to be often turned and renewed, in order to keep the requisite temperature, which, supplied in this way, contains much more moisture than would be procurable with the aid of fire heat. The hot-water pipes must, however, be available for use as well at any time required.

FORCING-HOUSE. The quantities of cut flowers and plants required in many gardens, render it a necessity to either build or set apart a special structure for forcing purposes, with provision for those subjects needing bottom heat, and a bed or staging for others that are better without. A Forcing House is also, sometimes, specially reserved

Forcing House—*continued.*

for such plants as Strawberries, where they are placed in a high temperature, after flowering is over, for the purpose of swelling and maturing the fruit. A span-roofed building is most suitable for accommodating plants of various heights, and is, at the same time, one that admits most light. If provided with a glass partition, and separate valves in the heating arrangements, an advantage is gained of keeping one part a little cooler than the other, and introducing plants into this when first starting them. The Forcing House should be in a sheltered position in the garden, but not so as to be shaded in winter; and it should have plenty of heat at command. A span-roofed structure admits of a centre stage with path round, and side beds under which pipes could be placed for bottom heat; or, in the case of a small one, the path may be through the centre, and beds arranged on either side. All plants may be stood near the light, in a house of this description, by raising or lowering them according to height, but this condition could not be procured so readily in one of another shape. Stronger and more equable bottom heat is obtained when the pipes pass through a shallow water tank underneath the plunging material. A span-roofed house, about 30ft. long, 16ft. wide, and 9ft. high, would allow considerable space for plants of various sizes, and would be most desirable for other purposes, when not required for forcing. A minimum temperature of from 50deg. to 55deg. is preferable to a higher one for starting most flowering plants not requiring bottom heat. This may be raised 10deg. after growth commences. Much must depend, in forcing, on the condition of the weather outside. Light syringings, with water as warm as the house, may be given on bright days, and all possible sun heat should be retained in the winter and early spring months, when forcing operations are of the greatest importance. The admission of air by the ventilators must be conducted with great care, when it becomes necessary to open them, on account of the tender foliage or flowers. A change of air takes place continually between the laps of the glass, particularly when the outside temperature is much lower than that inside. Fire heat should be stopped in the day-time, so soon as the sunshine is strong enough to give sufficient warmth without it.

FORFICULA AURICULARIA. *See* **Earwigs.**

FORGET-ME-NOT. *See* **Myosotis palustris.**

FORK. This is one of the most useful of garden implements, made in various sizes and shapes to specially suit the work for which any particular one is intended. Those with two prongs are best for light litter, and for mixing manure, &c. The four, and sometimes five-pronged Forks are those mostly used, being frequently more serviceable for digging or levelling down soil than the spade. It is an indispensable tool for removing earth from the roots of trees or shrubs when transplanting, as, if carefully worked from the stem outwards, the soil is loosened,

FIG. 22. FLAT-TINED DIGGING FORK.

and the roots uninjured in the process. The Fork is not in general use for digging, as it does not so thoroughly remove the earth at the bottom as the spade; but in many cases where the latter cannot, for various reasons, be properly worked, the former will be found a certain substitute. A good form for ordinary kitchen garden work, and for lifting crops, such as Potatoes, &c., is that made with four flattened prongs (see Fig. 22). The quality of the steel, with the proper mode of manufacturing the

Fork—*continued.*

implement, is of much more importance when purchasing than the difference in price would suggest; consequently, those from the best makers should be obtained. Some are easily bent when under pressure: others just as easily snap. A good Fork should be made of steel, so combined in the manufacture as to wear evenly, and in such a way that the prongs will neither snap nor bend when in ordinary use. Forks for loading leaves are specially made with four or five long tines, and are very useful in winter where large quantities have to be collected and taken away. Hand Forks are useful for plunging, planting out, &c.; they are made with three short flattened prongs, and a handle of the same size, like that of a trowel.

FORMICIDÆ. *See* **Ants.**

FORNICATE. Arched.

FORRESTIA (commemorative of Peter Forrest, a botanist of the seventeenth century). ORD. *Commelinaceæ.* A genus of seven species of pretty and singular stove perennials, of which one is from tropical Africa, and the rest natives of India and the Malayan Archipelago. For culture, *see* **Commelina.**

F. Hookeri (Hooker's). *fl.* purplish, capitate, sessile, bracteate, in dense clusters from the lower sheaths, and often from the naked stems after the leaves have fallen; sepals boat-shaped; petals much paler, almost white, ovate, acute. *l.* sub-succulent, obovate-lanceolate, finely cordate-acuminate, more or less hairy, deep purple beneath, at length glabrous above, and there uniformly green, striately veined; base tapering downwards, often very hairy, and terminating in a large, striated, often very villous, sheathing base. Stem herbaceous, 1ft. to 3ft. long, simple below, creeping and radicant, and leafless. *h.* 3ft. Malay Archipelago, 1864. (B. M. 5425, under name of *F. hispida.*)

FORSYTHIA (named in honour of William Forsyth, 1737-1804, the King's Gardener at Kensington, author of "Observations on the Diseases of Trees," London, 1791). ORD. *Oleaceæ.* Very ornamental hardy dwarf deciduous shrubs. Flowers yellow, drooping, solitary. Leaves simple or compound, glabrous. Branches slender. For culture, *see* **Fontanesia.**

FIG. 23. FLOWERING BRANCH OF FORSYTHIA SUSPENSA.

F. suspensa (hanging-down).* *fl.* yellow, few, scattered, on very slender branches; peduncles slender. *l.* simple and trifoliolate on the same branch, toothed; central leaflet largest. Japan and China. This is a very graceful shrub, which does thoroughly

Forsythia—*continued.*

well either as a climber against a wall, or treated as a bush in the open shrubbery border; it also forces readily. In nurseries, it is frequently met with under the names of *F. Fortunei* and *F. Sieboldi.* See Fig. 23. (S. Z. F. J. 3.)

F. viridissima (very green).* *fl.* yellow, numerous; peduncles much shorter than the flowers, bracteolate. March. *l.* all simple, entire, linear-lanceolate or oblong, acute. *h.* 10ft. Japan, 1845. (B. M. 4587.)

FORTUNEA. A synonym of **Platycarya** (which *see*).

FOTHERGILLA (named in honour of John Fothergill, 1712-1780, an eminent physician and patron of botany). ORD. *Hamamelideæ.* The only species of this genus is a pretty hardy deciduous shrub. It thrives best in a moist sandy peat; and may be increased by seeds, which should be sown in spring, in a peaty soil. The varieties may be propagated by layers.

F. alnifolia (Alder-leaved).* *fl.* white, sweet-scented, sessile, spicate, terminal, ovate, appearing before the leaves. April, May. *l.* alternate, obovate, stipulate, clothed with soft, starry down. *h.* 3ft. to 6ft. North-eastern America, 1765. The following are varieties:

F. a. acuta (acute). *l.* narrow, ovate, acute.

F. a. major (greater). *l.* ovate-oblong, somewhat cordate at the base. (B. M. 1342.)

F. a. obtusa (blunt-leaved). *l.* obovate, crenate at the top, when young downy beneath. (B. M. 1341.)

F. a. serotina (late-flowering). *l.* oblong, acute, crenately toothed at top.

FOUNTAINS. In connection with garden, conservatory, and room decorations, Fountains are represented in various forms, and are constructed in sizes varying from specimens of the most minute description in a room, to an enormous display of waterworks, as shown in extensive public gardens and other establishments. An important point in the introduction of a Fountain is the selection of a situation that is at once appropriate and in keeping with surrounding objects. The centre of an inclosed flower garden, of a formal description and geometrically laid out, could not, perhaps, be better occupied than with a Fountain and circular basin, having a walk round it in connection with other cross walks formed at right angles. Intersecting points are best in any case, on account of the means thereby supplied of utilising the water from the basin. Either a single jet or an indefinite number, if desired, must be in connection with an elevated reservoir or other source of supply from which a force can be obtained, and they may be fixed so as to conduct the water in various directions, and cause it to disperse and descend in minute particles. The jets are best arranged amongst a pile of rockwork or large stones, that help to conceal them from view when the water is stopped. A Fountain has a cooling effect in a conservatory, in summer; and when constructed in a prominent position, as in the centre, it is invariably a source of attraction. In some of the most extensive and beautiful summer floral decorations, a small Fountain is introduced, with flowers of various Nymphæas, &c., dropped in the water beneath. This forms an interesting and novel addition, and one that is generally much admired.

FOUQUIERA (named in honour of Peter Edward Fouquier, M.D., a French physician). ORD. *Tamariscineæ.* A genus containing three species of very glabrous, spinose trees or shrubs, natives of Mexico. *F. formosa* is described as being a very showy stove shrub. It thrives in a loamy and fibry peat; and is increased by cuttings, planted in heat, under a bell glass.

F. formosa (splendid).* *fl.* scarlet, 1in. long, disposed in terminal erect spikes; corolla tube cylindrical, a little arched; limb spreadingly reflexed. *l.* oblong, scattered, rather fleshy. *h.* 6ft. to 10ft.

FOUQUIEREÆ. A tribe of *Tamariscineæ.*

FOURCROYA. *See* **Furcræa.**

FOX-BANE. *See* **Aconitum vulparia.**

FOXGLOVE. *See* **Digitalis.**

FRAGARIA (from *Fraga*, the old Latin name, from the same root as *fragrans*, fragrant; referring to the perfume of the fruit). Strawberry. ORD. *Rosaceæ*. A genus of three or four species of hardy (except where otherwise stated) perennial scapigerous herbs, with runners, natives of North temperate regions, the Andes, Sandwich Islands, and Bourbon. Flowers white or yellow, honeyed, often polygamous; achenes many, minute, embedded on the surface of the large convex fleshy receptacle. Leaves three-foliolate (in the British species), pinnate or one-foliolate. Several of the so-called species have, without doubt, originated from two or three; many of them, however, preserve a well-marked character. For cultivation, *see* **Strawberry.**

FIG. 24. FRAGARIA CHILENSIS (CHILI STRAWBERRY).

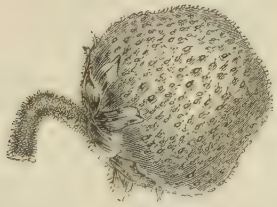


FIG. 25. FRUIT OF FRAGARIA CHILENSIS.

F. chilensis (Chilian).* *fl.* white; sepals erect; peduncles thick and silky. April and May. *fr.* rose-coloured, flesh white, pendulous. *l.*, leaflets obovate, obtuse, serrated, coriaceous, wrinkled, silky beneath. *h.* 1ft. South America, 1727. See Figs. 24 and 25.

F. c. grandiflora (large-flowered).* Pine Strawberry. *fl.* white; sepals reflexed; peduncles thick. April and May. *fr.* red. *l.*, leaflets glaucous, coriaceous, broadly crenated, pilose beneath. *h.* 1ft. 1759. See Figs. 26 and 27.

F. collina (hill). Green Pine. *fl.* white; sepals, after flowering, erect. April to June. *fr.* green. *l.*, leaflets plicate, thin, silky above and pilose beneath. *h.* 9in. Europe, 1798.

F. elatior (taller). Hautbois. *fl.* white; sepals at length reflexed on the peduncles. April and May. Receptacle firm, adhering but little to the calyx. *l.*, leaflets plicate, rather coriaceous, green. *h.* 1ft. Europe. This, which is much larger than *F. vesca*, is probably derived from that species; it is frequently met with as a garden escape in a semi-naturalised condition in Britain. (Sy. En. B. 439.)

F. indica (Indian).* *fl.* golden-yellow; calyx ten-parted, outer five segments accessory, large, foliaceous, tridentate at the apex, and spreading; peduncles axillary, solitary, one-flowered. May to October. *fr.* red, insipid, numerous. *l.* trifoliolate; leaflets cuneate-ovate, deep green, crenated. India, Japan, &c., 1805. A very pretty little greenhouse trailer. (A. B. R. 479.)

Fragaria—*continued.*

FIG. 26. FRAGARIA CHILENSIS GRANDIFLORA (PINE STRAWBERRY).

FIG. 27. FRUIT OF FRAGARIA CHILENSIS GRANDIFLORA.

F. vesca (edible). Common Wild Strawberry. *fl.* white; sepals at length reflexed. April and May. *fr.* pendulous. *l.*, leaflets plicate, thin, pilose beneath. *h.* 6in. to 12in. Britain. See Figs. 28 and 29. (Sy. En. B. 438.)

FIG. 28. FRAGARIA VESCA (WILD STRAWBERRY).

FIG. 29. FRUIT OF FRAGARIA VESCA.

F. v. monophylla (one-leaved). Alpine Strawberry. *fl.* white. May. *fr.* round, small, pendulous; receptacle elongated, red. *l.* simple, crenately toothed. *h.* 6in. Europe, 1773. (B. M. 63.)

F. virginiana (Virginian). Scarlet Strawberry. *fl.* white; peduncles and pedicels length of leaves. April. *fr.* deep red when ripe; receptacle very tumid, pendulous. *h.* 1ft. North America, 1629.

FRAMES, GARDEN. Frames are portable garden structures among the most useful for various purposes at all seasons, particularly in spring and early summer, when large quantities of different subjects have to be prepared for transplanting outside. They may also be effectively employed in forcing operations, where pits are limited, by being placed on a hotbed of fermenting material, and covered with mats and dry litter, according to the state of the weather, or the amount of heat required inside. Cucumbers and Melons, and a large proportion of greenhouse winter-flowering plants in pots, as well as those for more immediate use, may be successfully cultivated in Frames during the summer. In winter, the latter may be utilised for storing plants that merely require protection from frost, by placing a quantity of dry litter round the woodwork, and covering the glass with mats, &c. Frames are made of different sizes, none being so generally useful as those having two sashes, each measuring about 6ft. long by 4ft. wide (see Fig. 30, for which, and for Fig. 31, we are indebted to Messrs. Boulton and Paul, of Norwich), or others large enough to take three sashes of similar dimensions. The frames of these sashes should be 2in. thick, and each fitted with an iron handle for opening, and a cross bar of iron for strengthening them. The Frame or box itself is usually made of deal timber, 1¼in. or 1½in. thick, a height of 18in. being allowed at the back, and 13½in. at the front, or other heights may be adopted in a similar proportion. The corners should be dovetailed,

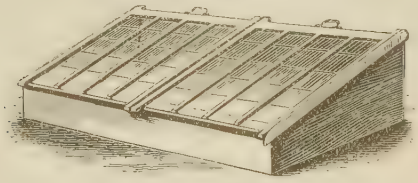


FIG. 30. TWO-LIGHT FRAME.

and further strengthened by pieces of wood fitted inside. Frames may be purchased ready for use, but they are expensive, and seldom so strong as those which can be made at home, somewhat like that above described. A new Three-quarter Span-roof Frame, made by Messrs. Boulton and Paul, of Norwich, is represented in Fig. 31. When made in this shape, it has the advantage of giving more height inside than with the ordinary sashes. The sashes here shown are hung to the ridge in such a way that

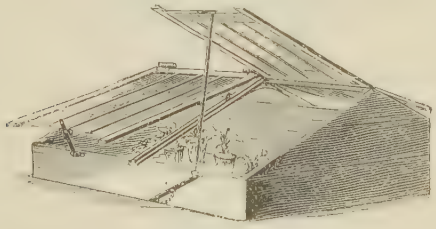


FIG. 31. THREE-QUARTER SPAN-ROOF FRAME.

the front ones may be turned right over on the others at the back, and the reverse. An iron prop accompanies each Frame, to hold the lights wide open for attending to the plants, and each light is provided with a fastening that serves the double purpose of securing it against wind, and raising it for ventilation. Like the ordinary Frames, these are made in various sizes. Other sorts may be procured with iron standards and framework, the

Frames, Garden—*continued.*

sashes being made of wood, and glazed in the ordinary way, or without putty. One of the most popular and best-constructed of this description is that made by Messrs.

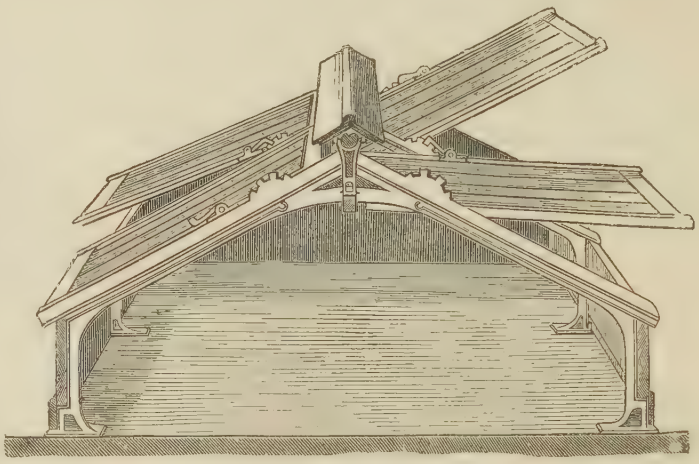


FIG. 32. SPAN-ROOF FRAME.

Foster and Pearson, Nottingham (see Fig. 32). A somewhat novel, but effective, mode of ventilation is adopted. The sashes are held open at any angle required, by dropping a stout hook, attached to each, into a contrivance cast in the iron rafters, something like part of a cog-wheel. This holds them safely in any position in which they are placed. The sashes may easily be removed and replaced if desired; and the ridge is made to lift up and down its whole length by a lever, as a means of ventilation in wet weather. Where expense in purchasing is no object, Frames like this are very useful and durable. They are best suited to remain where placed permanently. For sectional representations of simple and chambered Frames, *see* **Cucumber.**

FRANCISCEA. *See* **Brunfelsia.**

FRANCOA (named in honour of F. Franco, M.D., of Valentia, a promoter of botany in the sixteenth century). ORD. *Saxifrageæ.* A Chilian genus, all the species of which are described below. They are very handsome hardy or half-hardy perennials, beset with simple hairs or glands. Flowers terminal, copious, in spicate racemes. Leaves lyrate, nearly like those of the Turnip, reticulately veined. Seeds should be sown, about February or March, in a well-drained pan of sandy peat, covered over with a pane of glass, and in a heat of about 50deg. The glass covering may be removed when the seedlings have made a little growth. So soon as the plants are large enough to handle, they should be transferred to other pans, at a distance of about 2in. apart. About April or May, they may be potted off into 4in. pots, and placed in a cool greenhouse or frame. Increased also by divisions.

F. appendiculata (appendaged).* *fl.*, petals pale red, marked each by a deeper spot near the base; scape nearly simple; racemes compact. July. *l.* petiolate, lyrate. *h.* 2ft. 1830. (B. M. 3178; misnamed *F. sonchifolia* in L. B. C. 1864.)

F. ramosa (branched).* *fl.* white, loosely arranged; rachis and sepals glabrous; inflorescence much branched. July, August. *l.* shortly stalked, usually decurrent. *h.* 2ft. to 3ft. 1831. Plant caulescent. (B. M. 3824.)

F. sonchifolia (Sowthistle-leaved).* *fl.* loosely arranged; petals pink, often with a darker blotch near the base. July. *l.* with short petioles, usually decurrent below the auricles to the extreme base. *h.* 2ft. 1830. (B. M. 3309; S. B. F. G. vol. 5, 169.)

FRANCOEÆ. A tribe of *Saxifrageæ*,

FRANGIPANI-PLANT. *See* **Plumiera tricolor.**

FRANGULA. Included under **Rhamnus.**

FRANKENIA (named after John Frankenius, 1590-1661, Professor of Botany at Upsal, who first enumerated the plants of Sweden, in "Speculum Botanicon," 1638). Sea Heath. Including *Beatsonia* and *Hypericopsis*. ORD. *Frankeniaceæ*. Small, prostrate, Heath-like, hardy or half-hardy evergreen plants, with the flowers usually rising from the forks of the branches, or disposed in terminal cymes. Several of the species are pretty subjects for rockwork, or in borders of dry, light, sandy soil. Increased by divisions.

F. capitata Nothria (headed Nothria). *fl.* pale red, terminal, aggregate; petals toothed. June to August. *l.* clustered, linear, glabrous, with revolute margins, ciliated at the base. Stems prostrate, glabrous. Cape of Good Hope, 1816. Hardy.

F. corymbosa (corymbose). A synonym of *F. Webbii*.

F. lævis (smooth).* *fl.* flesh-coloured, rising from the forks of the stem, terminal or axillary, solitary. July. *l.* clustered, linear, glabrous, with revolute margins, ciliated at the base. Stems prostrate, rooting. This native species is one of the prettiest. (Sy. En. B. 190.)

F. pauciflora (few-flowered). *fl.* pink, closely sessile in the last forks, forming a more or less dense terminal leafy cyme, and sometimes unilaterally arranged along its branches. July. *l.* opposite, or the upper ones in whorls of four, oblong-linear, obtuse, or rarely almost acute; margins usually revolute. Branches ascending, dichotomous, erect or divaricate, nearly glabrous, with short down. *h.* 1ft. Australia, 1824. Half-hardy; shrubby, procumbent. SYN. *F. scabra*. (B. M. 2896.)

F. portulacifolia (Purslane-leaved). *fl.* red. *l.* roundish, fleshy, glabrous. Stem shrubby, bushy. *h.* 6in. St. Helena. Half-hardy. SYN. *Beatsonia portulacifolia*.

FIG. 33. FLOWERING BRANCH OF FRANKENIA PULVERULENTA.

F. pulverulenta (powdery).* *fl.* red, solitary; petals sub-repand. July. *l.* roundish-ovate, powdery beneath. *h.* 3in. South Europe. Hardy. See Fig. 33. (S. F. G. 344.)

F. scabra (rough). A synonym of *F. pauciflora*.

F. Webbii (Webb's). *fl.* rose-coloured, in terminal corymbs. June and July. *l.* clustered, linear, with revolute margins, glabrous, somewhat ciliated at the base. Stems velvety, erect. *h.* 6in. South-west Europe, &c., 1823. Hardy. SYN. *F. corymbosa*.

FRANKENIACEÆ. A small order of herbs or sub-shrubs, containing one genus, *Frankenia*. The species number about twelve, and are widely dispersed over the sea-coasts of nearly all the temperate and warmer regions of the globe. They possess no properties of importance.

FRASERA (named after John Fraser, 1750-1811, a collector of North American plants). ORD. *Gentianeæ*. A genus of about seven species of North-west American hardy perennial herbs. Flowers axillary, stalked; corolla wheel-shaped, four-cleft. Leaves opposite or verticillate. They thrive in a moist situation, and may be increased by seeds, or by divisions.

F. carolinensis (Carolina). A synonym of *F. Walteri*.

Frasera—*continued.*

F. Walteri (Walter's). *fl.* yellowish, verticillate, on short, one-flowered pedicels. July. *l.* opposite and sub-verticillate, oblong. Stems and branches tetragonal. *h.* 3ft. to 6ft. Carolina, 1795. SYN. *F. carolinensis*.

FRAXINEÆ. A tribe of *Oleaceæ*.

FRAXINELLA. *See* **Dictamnus albus.**

FRAXINUS (the old Latin name of the tree). Ash. Including *Ornus*. ORD. *Oleaceæ*. Large, ornamental, hardy deciduous trees, with lateral racemes of greenish-yellow or whitish flowers, and opposite, unequally pinnate, rarely simple leaves. They flourish in moderately good soil, in sheltered situations. Propagation is effected chiefly by seeds, the varieties being increased by grafting. The seeds of the common Ash ripen in October, and should be gathered and laid in an open pit, constructed in a place where the soil is light and porous. Two bushels of sand should be mixed with each bushel of seed, and the whole put into this pit till the February following, during which time it must be turned over several times, to prevent heating. The seeds should be sown in beds, in good friable soil, a sandy loam being the best for the purpose. After remaining two years in the seed bed, the plants may be removed, and placed, at a distance of 6in. from each other, in rows 1½ft. apart. These should stand two years longer, when they will be fit for permanently planting out during any mild weather in autumn or early spring. Exclusive of the many varieties, the present genus is comprised of about thirty described species. About ten of these are natives of North America.

F. acuminata (taper-pointed). A synonym of *F. americana*.

F. alba (white). A synonym of *F. americana*.

F. americana (American).* White Ash. *fl.* white, disposed in terminal panicles. April and May. Samaras narrow, obtuse, mucronate. *l.* with two to four pairs of ovate or ovate-acuminated, shining, serrated leaflets, 3in. to 5in. long, and 2in. broad. Branches brownish-grey. *h.* 30ft. to 40ft. East United States, 1723. SYNS. *F. acuminata*, *F. alba*, *F. Curtisii*, *F. epiptera*, and *F. juglandifolia* (of Lamark). The variety *latifolia* has broader leaves than the type.

F. angustifolia (narrow-leaved). A synonym of *F. excelsior australis*.

F. argentea (silvery). A synonym of *F. Ornus*.

F. caroliniana (Carolina). A synonym of *F. platycarpa*.

F. concolor (one-coloured). A synonym of *F. viridis*.

F. Curtisii (Curtis's). A synonym of *F. americana*.

F. epiptera (wing-topped). A synonym of *F. americana*.

F. excelsior (taller).* Common Ash. *fl.* greenish-yellow, naked, produced in small crowded axillary panicles. March and April. Samaras linear-oblong, notched at the tip. *l.*, leaflets in five or six pairs, almost sessile, lanceolate-oblong, acuminate, serrated, cuneated at the base. *h.* 30ft. to 80ft. Europe (Britain). (B. M. Pl. 171.) Of the numerous varieties of this fine tree, the following is a pretty extensive and comprehensive list. As a rule, the name indicates the general distinctive character of each sort: *aucubæfolia*, *aurea*, *aurea pendula*, *aurea pendula stricta*, *coarctata*, *crispa*, *heterophylla*, *heterophylla variegata*, *horizontalis*, *oxyacanthifolia*, *pendula*, *pendula foliis variegatis*, *scolopendrifolia*, *simplicifolia* (=*monophylla*), *simplicifolia laciniata*, *spectabilis*, *viridis*, and *Wentworthi pendula*.

F. e. australis (Southern). *fl.* greenish-white, naked. May. Samaras in three or four pairs, 1½in. to 2in. long, lanceolate. *l.*, leaflets sessile, lanceolate, remotely denticulated; peduncles below the leaves, solitary, 2in. long. Branchlets green, dotted with white. *h.* 30ft. to 50ft. South-west Europe and North Africa, 1815. SYN. *F. angustifolia*.

F. floribunda (bundle-flowered). *fl.* white, in compound, thyrsoid, terminal panicles. April. Samaras linear or narrow-spathulate, obtuse, and entire. *l.*, leaflets elliptic-oblong, acuminated, serrated, glabrous, stalked. *h.* 30ft. to 40ft. Nepaul, 1822. SYN. *Ornus floribunda*. (B. F. F. 37.)

F. juglandifolia (Walnut-leaved). A synonym of *F. viridis*.

F. juglandifolia (Walnut-leaved), of Lamark. A synonym of *F. americana*.

F. lentiscifolia (Lentiscus-leaved). A synonym of *F. oxyphylla parvifolia*.

F. longicuspis (long-pointed). *l.* with two or three pairs of lanceolate, very acuminate leaflets. Japan, 1869.

F. Mariesii (Maries'). *fl.* white, in numerous erect strict panicles from the uppermost axils. *l.* 4in. to 6in. long; petiole and rachis

Fraxinus—*continued.*

slender; leaflets five. Northern China, 1880. A small tree. (B. M. 6678.)

F. nigra (black). A synonym of *F. pubescens.*

FIG. 34. FLOWERING BRANCH OF FRAXINUS ORNUS (MANNA ASH).

F. Ornus (Ornus). Manna Ash. *fl.* greenish-white, complete or hermaphrodite; peduncles axillary, shorter than the leaves. May and June. Samaras brown. *l.*, leaflets lanceolate or elliptic, attenuated, serrated, stalked, entire at the base, villous or downy beneath. Young branches purplish or livid, with yellow dots. *h.* 20ft. to 30ft. South Europe, 1730. A very handsome and free-flowering tree. SYNS. *F. argentea, F. rotundifolia,* and *Ornus europæa.* See Fig. 34. (W. D. B. 2, 107.)

F. oxycarpa (sharp-fruited). A synonym of *F. oxyphylla.*

F. oxyphylla (sharp-leaved). *fl.* greenish-yellow, naked. May. Samaras lanceolate, attenuated at both ends, mucronate. *l.* dark glossy green, produced in tufts at the ends of the branches; leaflets two to three pairs, almost sessile, lanceolate, acuminated, serrated. Branchlets green, with white dots. *h.* 30ft. to 40ft. Caucasus, 1815. SYN. *F. oxycarpa.*

F. o. parvifolia (small-leaved). *fl.* greenish-yellow, naked. May, June. Samaras narrow, gradually widening to the apex, and retuse there. *l.*, leaflets four to five pairs, petiolate, oblong and lanceolate, sharply serrated; serratures mucronate. Branches dark purple. *h.* 30ft. to 50ft. Aleppo, 1710. SYN. *F. lentiscifolia.*

F. pallida (pale). A synonym of *F. platycarpa.*

F. pauciflora (few-flowered). A synonym of *F. platycarpa.*

F. pennsylvanica (Pennsylvanian). A synonym of *F. pubescens.*

F. platycarpa (broad-fruited). Carolina Water Ash. *fl.* greenish-yellow. May. Samaras broadly winged, 2in. long. acute at both ends. *l.*, leaflets almost sessile, very distinctly serrated, elliptic-lanceolate, 2in. long, 1in. broad. *h.* 30ft. to 50ft. Eastern United States, 1724. SYNS. *F. caroliniana, F. pallida, F. pauciflora,* and *F. triptera.*

F. potamophila (swamp-loving). *fl.* greenish, in short dense racemes. Samaras stalked, oblong, with a wedge-shaped base. *l.* small. Young branches of a greyish-brown colour, with black buds. Turkestan.

F. pubescens (downy). *fl.* greenish-yellow, calyculate; racemes rather compound. May. Samaras narrow-lanceolate, obtuse, with a short mucro at the apex, 2in. long. *l.*, leaflets three to four pairs, petiolate, elliptic-ovate, serrated, downy or tomentose beneath, as well as the petioles and branches. *h.* 30ft. Eastern United States, 1811. SYNS. *F. nigra, F. pennsylvanica, F. tomentosa.*

F. quadrangulata (four-angled). Blue Ash. *fl.* greenish-yellow. May. Samaras blunt at both ends. *l.* 1ft. to 1½ft. long; leaflets two to four pairs, almost sessile, elliptic-lanceolate, serrated, downy beneath. Branches quadrangular. *h.* 60ft. to 70ft. Eastern United States, 1823.

F. rotundifolia (round-leaved). A synonym of *F. Ornus.*

F. sambucifolia (Elder-leaved). Black Ash. *fl.* like those of the common Ash. May. *l.*, leaflets three pairs, 3in. to 4in. long, acute at both ends, sessile, ovate-lanceolate, serrated. Young branches green, beset with black dots. *h.* 30ft. Eastern United States, 1800.

F. tomentosa (tomentose). A synonym of *F. pubescens.*

F. triptera (three-winged). A synonym of *F. platycarpa.*

F. viridis (green). *l.*, leaflets bright green both sides, or barely pale beneath, from oblong-lanceolate to ovate, mostly acuminate, and sparsely and sharply serrate or denticulate. *h.* 30ft. North America, 1824. SYNS. *F. concolor, F. juglandifolia.* There is a variety, *F. v. Berlandieriana.*

FREE. Not adhering to anything else; not adnate to any other body.

FREESIA (derivation unknown). ORD. *Irideæ.* A genus of a couple of species (in all probability, these are simply forms of one) of very pretty conservatory plants, from the Cape of Good Hope. They may be readily increased from seed, which should be sown as soon as ripe, in pots of light sandy soil, and placed in a sunny position, in a cool frame. When the young plants appear, air should be admitted; but draughts are very injurious, and must be specially avoided. As the seedlings do not succeed well transplanted, it is best to sow in 5in. pots, and thin out to six or eight of the strongest plants, this being about the space required for flowering bulbs. If sown in August, the young plants may flower the following spring, but this is by no means certain. They will, however, form good bulbs for the second year. Freesias intended for flowering should be shaken out of the old soil in August or September, and repotted in sandy loam, leaf mould, and decayed manure. The different sizes should be placed together in separate pots or shallow pans, in order to have plants uniform in strength when flowering. Water will not be required until growth commences, and a frame where frost is excluded will be warm enough. Plenty of air in mild weather, with a light position, is most conducive to a dwarf, sturdy growth. When the flowers appear, a little more heat may be applied to a portion for an earlier supply, others being left to form a succession. Freesias are largely and very successfully grown in Guernsey. They are potted in successive batches throughout the autumn, the first being inserted in August. These begin flowering in December, and the supply is kept up until late in spring. The flowers are very fragrant, and last a long time when cut and placed in water. A number of slightly varying forms have received distinctive names in nurseries.

F. Leichtlinii (Leichtlin's). *fl.* yellow or cream-colour; funnel narrowing abruptly into the tube; throat more open, with the segments spreading less horizontally than in *F. refracta. h.* 1ft. 1875. (R. G. 808.)

F. odorata (sweet-scented). A synonym of *F. refracta.*

F. refracta (bent back). *fl.* pure white, sometimes marked with a few violet lines, and usually with orange patches on the lower segments of the perianth; funnel long, gradually narrowing into the tube below; throat of funnel somewhat narrow; segments spreading horizontally, and with a peculiar fragrance. SYN. *F. odorata.* (B. R. 135.)

F. r. alba (white). *fl.* of the purest white, frequently without the orange-coloured blotches usually present in the type. See Fig. 35.

FREMONTIA (named after Colonel Fremont, an American officer). ORD. *Malvaceæ.* A beautiful hardy deciduous shrub, with coloured calyx, and without petals. It thrives in a sandy loam soil, and does well on a west or north wall, also as a bush in the Southern Counties of England. Increased by cuttings, in spring, placed under a hand glass; or by seeds.

F. californica (Californian).* *fl.* bright yellow, about 2in. across, solitary on short peduncles opposite the leaves. April. *l.* large, cordate, five to seven-lobed, hairy beneath; young shoots covered with a rich brown tomentum. *h.* 6ft. to 10ft. California, 1851. (B. M. 5591.)

FRENCH BEANS. *See* **Beans.**

FRENCH MARIGOLD. *See* **Tagetes patula.**

FRENELA. *See* **Callitris.**

FREYCINETIA (named after Admiral Freycinet, 1779-1842, the French circumnavigator). ORD. *Pandaneæ.* A genus of about thirty species, natives of Eastern tropical Asia, the Malayan Archipelago, tropical Australia, and the Pacific Islands. They are tall-growing evergreen stove climbers, suitable for clothing pillars, &c., which should, however, be bound round with sphagnum or fibrous peat, kept moist, so that the climbing stems may root into it. The soil in which the plants do best, either in pots or when planted out, is a well-drained sandy loam. Increased by offsets.

FIG. 35. FREESIA REFRACTA ALBA.

Freycinetia—*continued.*

F. Banksii (Banks'). *fl.*, spikes cylindrical, 3in. to 4in. long, surrounded by white, fleshy bracts. *fr.* 6in to 8in. long, and 6in. to 8in. in circumference, of a rich brown hue when ripe, edible. New Zealand. (B. M. 6028.)

FIG. 36. FREYCINETIA CUMINGIANA.

F. Cumingiana (Cuming's). This has shorter, ascending or horizontally spreading leaves (not arching, as in *F. Banksii*). It is, moreover, a more slender grower. See Fig. 36.

FREZIERA (named after A. F. Frezier, 1682-1773, a French engineer and traveller in Chili, who published an account of his travels in 1716). SYN. *Eroteum.* ORD. *Ternströmiaceæ.* A genus containing a dozen or more species of evergreen shrubs, with small axillary flowers, natives of tropical America. None are worthy of special mention.

F. theoides (Tea-like). A synonym of *Cleyera theoides.*

FRIESIA (named after Elias Magnus Fries, M.D., 1794-1878, a celebrated cryptogamic botanist). ORD. *Tiliaceæ.* This genus, now included under *Aristotelia*, contains but a single species, a very ornamental greenhouse evergreen shrub, and an excellent plant for growing against the wall of a conservatory. It thrives freely in a mixture of turfy loam and peat. Increased by cuttings, which root readily in sandy soil.

F. peduncularis (peduncled). *fl.* white; pedicels axillary, spreading, one-flowered, somewhat nodding. September. *l.* opposite, lanceolate, serrated. *h.* 3ft. to 6ft. Van Dieman's Land, 1818. (B. M. 4246.)

FRINGE FLOWER. *See* **Schizanthus.**

FRINGE-TREE. *See* **Chionanthus.**

FRITILLARIA (from *fritillus*, a chess-board; referring to the chequered flowers of some species). Fritillary. Including *Rhinopetalum* and *Theresia.* ORD. *Liliaceæ.* A genus comprising upwards of fifty species of hardy, bulbous plants. Flowers drooping, terminal or axillary, campanulate; perianth of six divisions, each with a nectar-bearing hollow at the base on the inside; style three-groved or trifid. Stems leafy. The usual mode of propagation is by offsets that are naturally developed by the plants when left undisturbed. Some of the free-growing species produce many more of these than the small slender ones. Seeds are ripened freely by some species, but not by all of them in this country. If desired, these may be sown when ripe, in pans of sandy soil, and the seedlings allowed to remain for the first year, the young plants being impatient of root disturbance. It takes from four to six years to grow them from seed to a size sufficiently large for flowering. All small offsets should be collected when the old bulbs are being lifted or replanted. If they are placed in lines, a short distance apart, in a piece of prepared ground, flowering specimens may be more quickly obtained. Fritillarias are best suited for positions in the mixed flower border, arranged according to their several heights. They should have a rich, well-drained soil, as anything like stagnant water near the bulbs, especially with the small-growing species, proves destructive. It is not advisable to lift the bulbs oftener than every three or four years, if it can be avoided, and then they should be replanted without delay, and surrounded with some new soil. A dressing of manure, to established plants of Crown Imperials, just after growth commences, is beneficial, as a number of roots proceed from the flower-stem just above the bulb. The latter should be planted at least 4in. to 6in. below the surface, and from 1½ft. to 2ft. apart. Fritil-

FIG. 37. FLOWERING STEMS OF FRITILLARIA AUREA.

Fritillaria—*continued.*

larias may be grown in large pots, if desired, in a cold frame, but must not be subjected to forcing in any way. They are perfectly hardy, and best suited for the open ground, but the young tender growths and flowers are liable to injury by late frosts in spring.

F. acmopetala (sharp-petalled). *fl.* more or less drooping; perianth campanulate; segments more or less flushed with purple on the back and tip, the rest greenish, obovate-oblong, obtuse. Spring. *l.* rather glaucous, all alternate, linear. Stem slender, glaucous, one-flowered. *h.* 1ft. Alps of Asia Minor, 1875.

F. armena (Armenian).* *fl.* soft yellow, nodding, solitary, bell-shaped. *l.* lanceolate, or linear-lanceolate. *h.* 6in. Armenia, 1878. A very pretty species, resembling our native one in time of flowering, &c. (B. M. 6365.)

F. aurea (golden). *fl.*, periahth bright yellow, solitary, cernuous, bell-shaped, 1in. deep, rounded equally from middle to base; divisions with seven to nine rows of small black tesseræ much broader than deep; outer segments oblong, ⅜in. broad; inner ones obovate, ¼in. broad. *l.* about ten to a stem; lower ones in whorls of three, linear, glaucescent, fleshy, 2in. to 3in. long; bract leaf solitary. Stem glaucescent, 6in. high. Cilicia, 1876. See Fig. 37. (R. G. 840.)

F. dasyphylla (thick-leaved). *fl.* more or less drooping; perianth broadly funnel-shaped; segments purplish on the back, yellow, without any tessellations inside, with a small green oblong foveole above the base. April. *l.* green, fleshy, all alternate, or the lowest (and sometimes the uppermost) opposite; the lowest oblanceolate-oblong, sub-obtuse; the others lanceolate and linear. Stem one (rarely two) flowered. *h.* 6in. Asia Minor, 1875. (B. M. 6321.)

F. delphinensis (Dauphiné).* *fl.* drooping, inodorous; perianth vinous-purple, spotted yellow, often obscurely tessellated; segments oblong, obtuse; anthers yellow, three lines long. *l.* four to six, all above the middle of the stem, upper ones linear, lower ones oblanceolate. Stem very often one-flowered. *h.* 6in. to 12in. South Europe.

F. d. Burnati (Burnat's). *fl.* solitary, nodding, about 2in. long, bell-shaped; segments of perianth carinate outside in the lower half, lurid brownish-red, close. *l.* linear-lanceolate, slightly glaucous. *h.* 6in. to 8in. 1879.

F. d. Moggridgei (Moggridge's). *fl.* yellow, tessellated inside with brown, solitary, large, cylindrical, bell-shaped. August. *l.* broad. *h.* 1ft. Maritime Alps, 1880. A very handsome variety. (Fl. Ment. 25.)

F. græca (Greek).* *fl.* solitary, rarely two, smaller than those of *F. Meleagris*, and less campanulate; sepals elliptical, slightly apart when fully open, tawny or ferruginous brown, spotted, but scarcely tessellated, with a dorsal green line continued to the projection which constitutes the nectary at the base. March. *l.*, root ones from young bulbs 4in. to 6in. long, lanceolate, tapering into a petiole; cauline ones elliptical or linear-lanceolate, nearly erect, striated. Stem slender, erect, terete. *h.* 6in. Greece. This plant is closely allied to *F. tulipifolia*. (B. M. 5052.)

F. Hookeri (Hooker's).* *fl.* pale lilac, racemose, bell-shaped, about 1in. long. Summer. *l.* about 8in. long. *h.* 6in. Sikkim, 1878. (B. M. 6385.)

FIG. 38. FRITILLARIA IMPERIALIS, showing Habit and detached Single Flower.

F. imperialis (Imperial).* Crown Imperial. *fl.* about the size of ordinary Tulips, varying in colour from yellow to crimson, drooping, disposed in a whorl at the top of the leafy stem, which is surmounted with a tuft of leaves. April. Stem 3ft. or more in height. Persia, 1596. See Fig. 38. (B. M. 194.) The following varieties are enumerated by Mr. T. S. Ware: *Aurora*, very distinct, curious bronzy-crimson flowers; *aurea marginata*,

Fritillaria—*continued.*

extremely showy, having the leaves margined with a broad, golden-yellow band; *lutea*, cluster of bright yellow flowers; *Minature*, a pretty, dwarf-growing, red-flowered variety; *rubra*, dark red flowers; *rubra maxima*, a fine form, with immense flowers; *Slagzwaard*, a fasciated form, immense deep red flowers; *sulphurine*, large, sulphur-coloured flowers.

F. involucrata (involucrate). *fl.* drooping; perianth vinous-purple, slightly tessellated; divisions oblong. May. *l.* linear-lanceolate, opposite below, forming a whorl of three above. Stems one-flowered. *h.* 1ft. Maritime Alps. (Fl. Ment. 35.)

F. kamtschatcensis (Kamtschatkan). *fl.*, perianth livid vinous-purple, not tessellated, campanulate, 1in. to 1¼in. long, the segments oblong-oblanceolate, obtuse; pedicels drooping, ½in. to 1in. long. Spring. *l.* ten to fifteen above the middle of the stem; lower ones in whorls, lanceolate, 2in. to 4in. long. Stem 6in. to 18in. high. Eastern Siberia, &c. SYN. *Lilium camtschatcense*. (R. G. 173.)

F. Karelini (Karelin's). *fl.* pale purple, spotted, bell-shaped, racemose. *h.* 6in. Central Siberia to Beloochistan, 1834. SYN. *Rhinopetalum Karelini*. (B. M. 6406.)

F. lanceolata (lanceolate-leaved). *fl.* dull vinous-purple. *l.* lanceolate, whorled. *h.* 1ft. to 1½ft. North-west America, 1872. (H. F. B. A. ii. 193.)

F. lutea (yellow).* *fl.* drooping; perianth yellow, more or less suffused with purple; segments oblong-lanceolate, five to eight lines broad. April and May. *l.* linear-lanceolate, alternate; the upper approximated, shorter than the terminal solitary flower. Stem very often one-flowered. *h.* 6in. to 1ft. Caucasus, 1812. (B. M. 1538.)

F. l. latifolia (broad-leaved). *fl.* vinous-purple, greenish, or tessellated with yellow. April and May. *l.* lanceolate, approximated; the upper opposite, as long as the terminal solitary flower. Caucasus, 1604. (B. M. 853, 1207.)

F. macrandra (large-anthered). *fl.*, perianth purple, with a glaucous tinge on the outside, yellow with green lines quite untessellated on the face, funnel-shaped; anthers two and a-half lines long, oblong, with a very distinct cusp. May. *l.* five or six, scattered, green, fleshy, ascending; lower ones oblong-lanceolate, 3in. to 4in. long; upper ones linear, under ½in. long. Island of Syra, 1875.

F. macrophylla (large-leaved).* *fl.* rose, racemose, horizontal, campanulate; perianth segments obovate-lanceolate, with a darker mass at base; stamens declinate. April to June. *l.* alternate, linear, acuminate, soft. *h.* 3ft. Mussooree, 1843. (B. M. 4725, under name of *Lilium roseum*; B. R. xxxi. 1, under name of *Lilium Thomsianum*.)

FIG. 39. FRITILLARIA MELEAGRIS, showing Habit and detached Single Flower.

F. Meleagris (Guinea-fowl-like).* Common Fritillary: Snake's Head. *fl.* chequered with pale and dark purple, terminal, pendulous, solitary; points of perianth turned inward. April. *l.* alternate, narrow-lanceolate. *h.* 1ft. Europe (Britain, especially in Oxfordshire) to Caucasus. See Fig. 39. (Sy. En. B. 1519.) There are white and double-flowered forms of this species.

F. meleagroides (Guinea-fowl-like). *fl.* dark purple. April. *h.* 6in. Altai Mountains, 1830. (B. M. 3280, under name of *F. minor*.)

F. montana (mountain). A synonym of *F. tenella*.

F. obliqua (oblique). *fl.* brown, purple; corolla turbinate. April. *l.* glaucous, numerous, oblique. *h.* 1ft. Caucasus. (B. M. 857.)

F. oxypetala (sharp-petalled). *See* **Lilium oxypetalum.**

F. pallidiflora (pale-flowered).* *fl.* yellow, beautifully chequered in the interior. *l.* large, glaucous-blue. *h.* 9in. Siberia, 1880. Very distinct. See Fig. 40. (R. G. 209.)

F. persica (Persian).* *fl.* deep violet-blue, rather small, bell-shaped, slightly scented. *h.* 3ft. Persia, 1596. Very distinct and curious. (B. M. 1537.)

F. p. minor (smaller). A smaller-flowered form, with the stamens slightly longer than the perianth. (B. M. 962.)

F. pudica (chaste).* *fl.* dark yellow, more than 1in. across, bell-shaped, usually solitary, sometimes twin. May. *l.* alternate, linear, glaucous. Stem upright, leafy. *h.* 6in. to 9in. North-west America. See Fig. 41.

Fritillaria—*continued.*

F. p. lutescens (yellowish) has a yellowish-green stripe on the outer segments of the perianth.

F. p. nigra (black) is a garden form, with leaves ¼in. to ⅜in. wide, and three or four dark-coloured flowers.

F. pyrenaica (Pyrenese).* *fl.* deep purple, large. June. *h.* 1½ft. Mountains of Southern France and Northern Spain, 1605. (B. M. 664.)

FIG. 40. FLOWERING STEM OF FRITILLARIA PALLIDIFLORA.

F. recurva (recurved).* *fl.* bright scarlet; perianth segments recurved. May. Stems one to nine-flowered. *h.* 2ft. California, 1870. A very distinct and beautiful species, with flowers nearly as large as those of *F. Meleagris*. See Fig. 42. (B. M. 6264.)

F. ruthenica (Russian). *fl.* brown and yellow. May. *l.* linear-lanceolate. *h.* 1ft. Caucasus, 1826. (S. B. F. G. ser. ii. 243.)

F. Sewerzowi (Sewerzow's). *fl.* drooping, forming a loose raceme; perianth lurid purple, with a glaucous tint outside, greenish-yellow within, not at all tessellated, funnel-shaped; segments sub-equal, oblanceolate-oblong, sub-acute, with a raised keel outside down the lower half, which is more strongly marked in the outer three, and a yellow-green linear nectary at the top of the claw inside. *l.* five or six below the inflorescence, all except the lowest opposite or sub-opposite, sessile, oblong, obtuse, rather glaucous when young. Stem long, glaucous, terete. *h.* 1½ft. Turkestan, 1873. A very curious plant. (B. M. 6371.) SYN. *Korolkowia Sewerzowi* (R. G. 760).

FIG. 41. FRITILLARIA PUDICA.

F. tenella (tender).* *fl.* yellowish, densely chequered with purple-brown; perianth divisions oblong-elliptic, rounded at apex, the nectariferous division at base narrow-oblong. April. *l.* distant from one another, nearly straight, linear-oblong; the uppermost two or three forming a whorl, rather distant from the flower; the lowest pair opposite or nearly so, the intermediate ones alternate. Stem stiff, nearly straight. Maritime Alps, 1867. SYN. *F. montana* (under which name it is figured in Fl. Ment. 66). There is a variety *racemosa* (figured in B. M. 952).

F. tulipifolia (Tulip-leaved).* *fl.* glaucous blue, solitary, variable in size, nodding, tulip-shaped; perianth segments sub-equal,

Fritillaria —*continued.*

oblong, obtuse, or obtusely apiculate, rusty brown-purple within, not tessellated; the outer dark glaucous blue, streaked with the

FIG. 42. FRITILLARIA RECURVA.

same purple outside; the inner with a broad glaucous blue band down the back. March. *l.* elliptic, or elliptic-lanceolate, sub-acute, concave, sessile, straight; sheath very short, nerveless,

FIG. 43. FLOWERING STEM OF FRITILLARIA VERTICILLATA THUNBERGII.

Fritillaria—*continued.*

pale green; upper linear-lanceolate. Stem slender, leafless below, but there clothed with appressed sheaths. Caucasus, &c., 1872. An elegant little plant, remarkable for the peculiar colour of its flowers. (B. M. 5969.)

F. verticillata (verticillate). *fl.* white, at the base externally green, and within at the base sprinkled with small purplish spots; solitary, axillary, or terminal, nodding; segments tipped with a green, callous, slightly pubescent apex. May. *l.* bright green, or slightly glaucous, somewhat crowded about the middle of the stem; the lowest pair opposite, many-nerved, without a conspicuous middle rib, ovate, tapering towards the apex, which is rather blunt. Stem simple. Altaic Mountains, 1830. (B. M. 3083, under name of *F. leucantha.*)

F. v. Thunbergii (Thunberg's).* *fl.* greenish, mottled with pale purple, small, solitary, bell-shaped. *l.* long, narrow, linear, terminating in a tendril. China and Japan, 1880. See Fig. 43.

F. Walujewi (Walujew's). *fl.* lead-coloured outside, within purple-brown, with whitish spots, large, solitary. *l.* linear, attenuated into a tendril; those at the middle of the stem verticillate. *h.* 1ft. Central Asia, 1879. (R. G. 993.)

FRITILLARY. *See* **Fritillaria.**

FRŒLICHIA (named in honour of Jos. Al. Froelich, a German physician and botanist, 1796-1841). ORD. *Amarantaceæ.* A genus containing about ten species of annual or perennial herbs, found in the warmer parts of the New World, from Texas to South Brazil. Flowers hermaphrodite, bracteate; spikes sessile or stalked. Leaves opposite, sessile (radical stalked), ovate, linear-oblong or spathulate. They thrive in sandy loam and leaf mould. Propagated by seeds sown in heat, in spring.

F. floridana (Florida). *fl.* white, tomentose or woolly, in ovate or oblong spikes. *l.* varying from linear to oblong; bracts mostly blackish, shorter than the woolly calyx. Stem, erect, simple or branched. *h.* 6in. to 3ft. Southern United States. (B. M. 2603, under name of *Oplotheca floridana.*)

FROG HOPPER, FROG SPIT, or **CUCKOO SPIT** (*Aphrophora spumaria*). The insects secreting "Frog Spit," which often so disfigures plants, are commonly known as Frog Hoppers. They belong to the same order as the *Aphidæ*, but to that section which has the whole of the upper wings leathery. There are two simple eyes or "ocelli," in addition to the two compound ones common to insects in general. It is the larvæ of the

FIG. 44. FROG HOPPER (APHROPHORA SPUMARIA), showing Larva, Frothy Secretion, and Perfect Insect.

"hoppers" that produce Cuckoo Spit (see Fig. 44). The former are plentiful in spring, while the perfect insects abound most in the autumn. When the curious-looking larvæ are deprived of the shelter afforded by this sugary secretion, they appear at first quite helpless, and, if the day be hot, are almost immediately killed. Hence an effectual mode of clearing plants of Cuckoo Spit, is to brush it off during sunshine, and the insects are at the same time destroyed. This pest attacks the young shoots of plants, choosing the axil of a leaf for its abode, and so damaging the shoot in some cases as to cause it to die or become malformed. Carnations, Pinks, and similar plants suffer greatly from its ravages. The following remedies, together with a frequent syringing with clear water, will be found effective:

Tobacco Liquid. To a gallon of water add 1oz. of soft soap, and, when thoroughly dissolved, mix a tablespoonful of Corry and Soper's Nicotine, well syringing the plants. This is best applied lukewarm, and then well washed off with clean water in about an hour.

Quassia. Steep ¼lb. quassia chips in a gallon of boiling water, and, when cold, add about the same quantity

Frog Hopper, &c.—*continued.*

of water. This should be applied with a syringe, and not washed off afterwards. It renders the stems of the plants nauseous, but does not injure them. Bitter aloes may also be used in a similar way.

FRONDS. The leaves of palms and ferns are improperly called Fronds. A true Frond is a combination of leaf and stem, as in many seaweeds and liverworts.

FROST. The presence of Frost denotes a fall of temperature to a point at which still water becomes solidified; and its intensity is known by the contraction of another liquid used in the construction of the thermometer, which does not become frozen at any temperature experienced in this country. Fahrenheit's scale is that in use for thermometers in Great Britain, and this places freezing point at 32deg., and boiling water at 212deg., the intervening space being divided equally into 180 parts, termed degrees. Similar divisions are made below freezing point, and the fall of the liquid in use, which is either Mercury or Spirits of Wine, below this indicates, in so many degrees, the amount of Frost. On plants or other subjects unprotected, the action of Frost is from the top downwards towards the earth; hence the value of, and safety frequently effected by, slight coverings that are non-conductors of heat, and consequently prevent its loss by radiation. The effect of Frost on plant life is not always in proportion to its intensity or the hardiness of the plant under what may be termed natural conditions. A spell of mild weather frequently places vegetation in a growing and tender state, especially in spring, when a sudden change to a few degrees of Frost may cause more destruction than a great deal at another time, when vegetation was more dormant. Frost acts most injuriously on anything wet, and is least destructive under the reverse condition. It is most successfully removed from plants too tender to withstand it, by adopting a method as gradual in effect as possible. Frost penetrates in a slow and natural way, and the greatest injury, if any, is caused when it is suddenly displaced by heat, either from sunshine or artificially. Syringing is sometimes recommended with tender subjects that have become frozen, but it should be remembered that water which is itself much above the freezing point, will, when applied, cause a sudden change to anything that is considerably below. Frost has a most beneficial effect on all soils exposed to its influence, by penetrating and pulverizing them, so that what was before unworkable and useless, is afterwards rendered fertile and amenable to the successful cultivation of various crops.

FRUCTIFICATION. All those parts composing the fruit of plants.

FRUIT. That portion of a plant which consists of the ripened carpels, and the parts adhering to them.

FRUIT BORDERS. *See* **Borders, Fruit.**

FRUIT GARDEN. *See* **Garden.**

FRUIT-GATHERING. This cannot be too carefully performed to avoid bruising, especially with those fruits having a tender skin. Dry weather should be selected at all times for the operation outside, and only such gathered as are at the proper stage. It sometimes becomes necessary, at the expense, however, of quality, to select Peaches and similar fruits several days before they are fully matured, to admit of packing and transmitting them to a distance. It is important, in gathering these, that the necessary pressure be equally applied by the whole of the fingers, and the fruits carefully placed bottom downwards on some soft material, in a shallow tray or basket. Nothing is more quickly bruised, or shows its consequent effect by decay, than thin-skinned ripe fruits. Those grown under glass are even more susceptible to injury in this way than hardier ones from outside. The keeping properties of Apples, Pears, and similar fruits,

Fruit-gathering—*continued.*

depend a great deal on careful gathering at the proper time, and subsequent storing; an indication of the time is generally known by some of the fruit falling off, and by the condition of the pips. Fruit-gathering is always best performed by two persons, one to carry a proper basket, and the other to collect and place the fruit in it.

FRUIT PROTECTORS. In the northern and other parts of the country, where Apricots, Peaches, &c., do not succeed in the open air, on account of the annual destruction of the flowers by frost, an erection of a

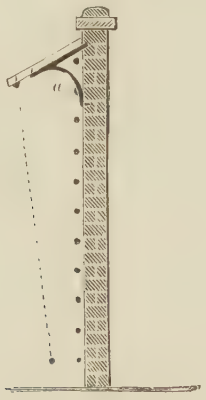


FIG. 45. WALL-FRUIT PLANT PROTECTOR.

glass Protector above them (see Fig. 45, *a*) may frequently be found of great value. The framework should be fixed on stout brackets, and glazed on a system that admits of the glass being removed in summer to allow rain and plenty of air to get to the trees. Netting, frigidomo, or other coverings, may be suspended from the front of the glass Protector, in the direction shown by the dotted line. A portable Plant and Fruit Protector (see

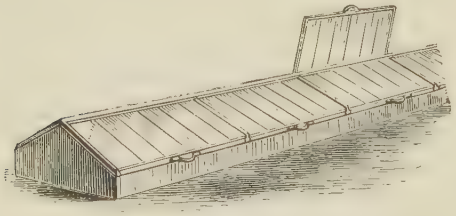


FIG. 46. PORTABLE PLANT AND FRUIT PROTECTOR.

Fig. 46) is usually a very useful structure for growing any dwarf subjects in summer, and for storing plants, such as Strawberries, in winter.

FRUIT-ROOM. A structure specially set apart in gardens for the storing and preservation of fruit. It should have a dry, airy position, and one affected as little as possible by fluctuations of temperature. Means to prevent the occurrence of these internally are introduced into the best-constructed Fruit-rooms by building with hollow walls, or by placing wood partitions round and above the shelves inside, and allowing a channel between them and the wall or roof for a free passage of air. The Fruit-room has usually a central walk and tiers of shelves on either side. The bottom of the latter should be of latticework, so as to allow plenty of air amongst the fruit. It is best to have heat at command, either by a small flue or stove, or, better still, by hot-water pipes, with means of applying or stopping it as desired. It is not advisable to give more heat than is sufficient to preserve a dry atmosphere and maintain a steady cool temperature. Fruit, when kept too warm, invariably shrivels, and, if

Fruit-room—*continued.*

allowed to become very cold, any change to warmer air causes a condensation of moisture over the surface that is most injurious. It is considered to keep and retain a better flavour when in a dark place, and, to this end, movable shutters or blinds may be used for excluding light at the windows. All fruit should be stored in a dry state, and constantly examined during winter for the removal of any part showing signs of decay, as a single specimen allowed to become rotten will speedily affect all others with which it comes in contact. A small ventilator in the roof, provided with means for closing in severe frost or in very changeable weather, will be sufficient to cause a change of air and allow the exhalations from the fruit to escape.

FRUTESCENT, FRUTICOSE. Shrubby.

FRUTICULOSE. Of very dwarf shrubby habit.

FUCHSIA (named after Leonard Füchs, 1501-1566, a German botanist). ORD. *Onagraceæ.* A genus comprising about fifty species of small shrubs or trees, natives, with comparatively few exceptions, of Central and Southern America, most of them having been introduced from Chili, Mexico, and Peru. Flowers usually drooping, on axillary one-flowered pedicels, which are sometimes disposed in racemes or panicles at the tops of the branches. Leaves generally opposite. The Fuchsia ranks as one of the most ornamental and popular of garden plants. The first plant is stated to have been brought to this country by a sailor, about the end of the last century. It was observed growing in his window by Mr. James Lee, a nurseryman, of the firm still existing under the name of Lee and Son, at Hammersmith, and, appearing to be a promising plant of an unknown kind, he succeeded, after some little trouble, in purchasing it. A stock was soon obtained, and the next year a large number of plants were distributed. The first representative of the genus had been discovered something like a century previous to this, but none had been introduced to this country. A few species arrived in succession up to about 1840, when the raising of varieties by seed seems to have commenced with that collected from species with long flowers, then recently received. From selection and careful fertilisation of the different flowers afterwards obtained, the numerous varieties now grown have descended. Until about thirty years ago, these only included flowers with a red tube and sepals, and a blue or purple corolla, or those with creamy-white sepals and rose or pink corollas. Then a variety was raised having a white corolla, and subsequently double flowers, in various colours, appeared. These all combined have produced the numerous varied selections of the present day. Several of the old species are still largely grown, the profusion in which the flowers are produced fully compensating for their small size individually. Many are amongst the most beautiful of hardy or half-hardy plants for outside borders, while others of a more tender constitution are distinct and interesting subjects for culture inside. *F. macrostema globosa*, *F. m. gracilis*, and *F. m. Riccartoni* are representatives of the former class; and *F. boliviana*, *F. corymbiflora*, *F. fulgens*, *F. microphylla*, *F. procumbens*, and *F. splendens*, of the latter description. The use of the floriferous varieties for decorative purposes is well known, their graceful and usually compact habit rendering them general favourites. Whether plants be required of a large size for exhibition, or others of smaller proportions for greenhouse or window decoration, centres of vases, and outside flower borders in summer, the Fuchsia is equally well adapted for one and all. Nothing is more attractive than these, in summer and autumn, in a greenhouse, if trained to the rafters or pillars, and their branches allowed to grow and droop naturally with the weight of the flowers.

Propagation is effected by seeds for the raising of new varieties, and by cuttings for the perpetuation of those

Fuchsia—*continued.*

already obtained, or for any of the species. Seeds ripen freely in summer on the majority of plants, if they are required. When ripe, they should be washed from the pulp surrounding them, and afterwards dried, being then either sown at once or kept until early the following spring.

Cultivation. Cuttings of Fuchsias, obtained from the points of young growing shoots that are free from flowers, root readily at any season. The best are those produced by old plants when started in early spring, and these may be grown very rapidly the following summer. If extra-sized specimens are desired, some cuttings should be inserted in autumn, and the young plants kept growing all the winter. These will then be established in pots by the time the others are put in, and will, consequently, be considerably advanced. It is not impossible, under favourable conditions and proper treatment, to insert Fuchsia cuttings in October, and grow pyramidal plants some 6ft. high to flower the following July. This is not the plan usually adopted, old-established plants, under good cultivation, being available for use several years in succession, and are, as a rule, easier to manage and more certain to succeed. The general treatment in the early stages is similar at any season. The cuttings should be placed in light soil, about six in a 3in. pot, and plunged in a warm propagating frame. When rooted, they should be potted singly and kept in a light position, to induce a short-jointed sturdy growth. A temperature of about 60deg., with a rise by sun heat, is one most suitable for the young plants in spring, and plenty of water should be applied, with a syringing in the morning and afternoon. Apart from inducing growth, this tends greatly to keep down insects. Many of the best-habited varieties will require but little stopping or training beyond placing a stick to the leading growth, and looping the others to it. Before the roots become much restricted for room, they should be placed in 5in. or 6in. pots, in which any of the plants will flower if so desired, or they may then be transferred to pots of almost any ordinary size. Fuchsias will succeed if proper attention be bestowed, in almost any soil; but where there is a choice, two parts loam to one of dried cow-dung, or any other good manure, should be selected, well mixed, and used in a lumpy state. Plenty of air and a slight shade are necessary for those grown under glass in summer, particularly when flowering. Liquid manure may be used with advantage so soon as the pots are filled with roots. Stock plants, or any required for growing another year, may be ripened outside, and stored at the approach of frost in any cool dry place. These should not be repotted until new growth has commenced. Tender varieties grown in the open air should be at least one year old when planted, and they may be lifted and treated in a similar way. The hardy ones are more safe if covered with a mound of ashes after being cut down for the winter. Those cultivated on rafters or pillars in a greenhouse should be planted out and allowed to grow at will, except a little thinning of the growths occasionally; they may be kept dry at the root in winter and pruned back to a couple of eyes at the base of each shoot.

F. alpestris (mountain). *fl.* pale crimson; petals broadly cuneate, obtuse, deep purple. August. *l.* opposite, never ternate, oblong-lanceolate, acuminate, their margins slightly revolute and distantly sub-dentate, pubescent above and below. Branches round, densely pubescent. *h.* 20ft. Organ Mountains, 1842. In its native habitat, this plant has a rambling, sub-scandent habit, the branches being from 12ft. to 18ft. or 20ft. high. (B. M. 3999.)

F. apetala (apetalous).* *fl.* drooping, 1½in. long; calyx red; lobes pale yellow; pedicels sub-corymbose, shorter than the flowers. *l.* alternate, petiolate, ovate, acuminated, quite entire. *h.* 1ft. to 2ft. Peru. See Fig. 47.

F. arborescens (tree-like). *fl.* rose-coloured, as are also the rachides and pedicels, numerous, in copiously branched terminal panicles. October to February. *l.* elliptic, attenuated at both ends. Mexico, &c. Small tree or tall shrub. (B. M. 2620.) SYNS. *F. paniculata* and *F. syringæflora* (R. H. 1873, 311).

Fuchsia—*continued.*

F. bacillaris (rod-branched). *fl.* on slender drooping pedicels, springing from the copious upper and younger branchlets, and thus forming a rather large leafy thyrse, or compact panicle; petals deep rose, sub-obcordate, spreading, nerved, bearing a blunt mucro at the retuse apex. Summer. *l.* opposite or ternate, lanceolate or ovate-lanceolate, entire or denticulo-serrate, small, nearly sessile, penninerved. Branches with reddish bark. Mexico. A low-growing shrub. (B. M. 4506.)

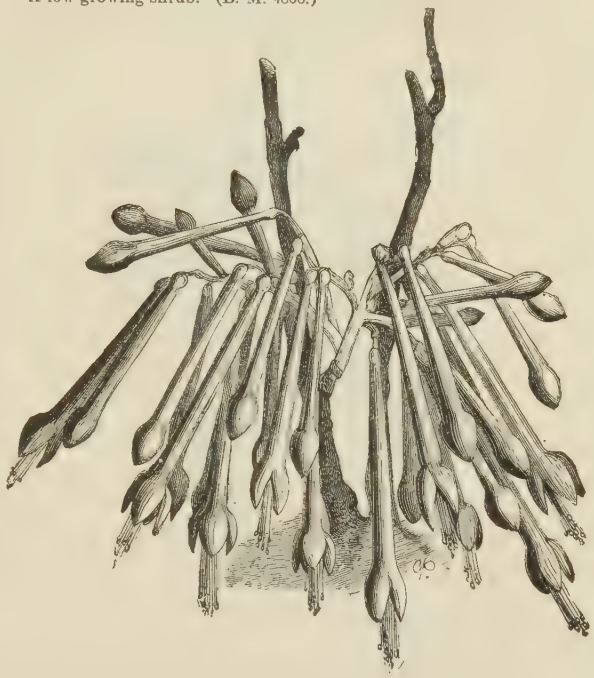


FIG. 47. FLOWERING BRANCH OF FUCHSIA APETALA.

F. boliviana (Bolivian).* *fl.* rich crimson, 2in. to 3in. long, tube trumpet-shaped. *h.* 2ft. to 4ft. Bolivia, 1876. Of a compact branching habit, and free growth. (R. H. 1876, 150.)

F. coccinea (scarlet). *fl.*, petals violet, obovate and convolute; sepals scarlet, purple at the base, oblong, acute. Summer. *l.* small, ovate, obtuse, denticulated, on short hairy petioles, downy white underneath, nearly glabrous above. *h.* 3ft. Brazil (?). A very pretty bushy plant, with slender downy branches. (B. M. 5740.)

F. corallina (coral-red).* *fl.* pendulous; corolla dark plum-colour; sepals crimson. *l.* of greenish-crimson tint, the under side being of a dark crimson, opposite, in whorls of four or five. Young stems dark red; old ones attaining a considerable height (20ft. in favourable spots in West of England) and thickness. (G. C. n. s., xx. 565, under name of *F. exoniensis.*)

FIG. 48. FLOWERING BRANCH OF FUCHSIA CORYMBIFLORA.

Fuchsia—*continued.*

F. cordifolia (heart-leaved). *fl.* scarlet, green; pedicels axillary, solitary, one-flowered; calyx downy; tube longer than ovate petals. August and September. *l.* opposite or ternate, cordate, acuminate, denticulate, nearly glabrous. *h.* 5ft. Mexico, 1840. (B. R. 1841, 70.)

F. corymbiflora (cluster-flowered).* *fl.* scarlet, nearly 2in. long, in long terminal clusters; petals oblong-lanceolate, bifid; sepals lanceolate, acute. Summer. *l.* large, opposite, oblong-lanceolate, almost entire, with a rosy midrib. Branches somewhat tetragonal, reddish and downy when young. *h.* 4ft. to 6ft. Peru, 1840. See Fig. 48. (B. M. 4000.)

FIG. 49. FLOWERING BRANCH OF FUCHSIA FULGENS.

F. cylindracea (cylindrical-flowered). *fl.* scarlet. August. *h.* 2ft. Demerara, 1837. (B. R. 66.)

F. decussata (decussate). A synonym of *F. macrostema gracilis.*

F. dependens (drooping).* *fl.*, tube soft scarlet; corolla deeper in colour, in terminal leafy pendulous racemes. Summer. *l.* whorled, ovate-acute, toothed, slightly pubescent above, paler and more decidedly hairy beneath. Chili. *h.* 2ft. to 4ft.

FIG. 50. FLOWERING BRANCH OF FUCHSIA MACROSTEMA GLOBOSA.

Fuchsia—*continued.*

F. Dominiana (Dominy's). A garden hybrid, raised by Messrs. Veitch in 1852, between *F. serratifolia* and *F. spectabilis.* (F. d. S. 1004.)

F. fulgens (glowing).* *fl.* scarlet, 2in. long; petals acutish, shorter than the ovate-lanceolate acute sepals; racemes drooping at the apex. Summer. *l.* opposite, large, ovate-cordate, acute, denticulated, glabrous. *h.* 4ft. to 6ft. Mexico, 1830. See Fig. 49. (B. M. 3801.)

FIG. 51. FUCHSIA MACROSTEMA GRACILIS, showing Habit, and detached Single Flower and Leaf.

F. macrantha (long-flowered). *fl.* rosy, green, apetalous; pedicels axillary, solitary; tube of calyx long. April to June. *l.* ovate-acute, entire. *h.* 3ft. Columbia, 1844. Plant downy. (B. M. 4233.

FIG. 52. FLOWERING BRANCH OF FUCHSIA MACROSTEMA PUMILA.

Fuchsia—*continued.*

F. macrostema (large-stamened).* *fl.*, calyx scarlet; lobes of calyx oblong, acute, exceeding the obovate spreading petals; pedicels axillary, nodding, longer than the flowers. July to October. *l.* three in a whorl, ovate, acute, denticulated, on short petioles. Branches glabrous. *h.* 6ft. to 12ft. Chili, 1823. SYN. *F. magellanica.*

F. m. conica (conical). *fl.* pendulous, solitary; petals purple, about equal in length to the scarlet sepals; tube of corolla conical. June to October. *l.* three or four in a whorl, ovate, flat, denticulated, glabrous; petioles pubescent. *h.* 3ft. to 6ft. Chili, 1824. (B. R. 1062.)

F. m. globosa (globose).* *fl.* globular; petals purplish-violet; sepals purplish-red. Summer. *l.* ovate, acute, small, denticulated. *h.* 5ft. to 6ft. Chili. See Fig. 50. (B. M. 3364.) A seedling from this (*F. riccartoni*), one of the most handsome and the hardiest of all the outdoor Fuchsias, was raised at Riccarton, near Edinburgh, about 1830; it stands the winters, in many parts of Scotland, uninjured.

F. m. gracilis (slender).* *fl.*, petals purple, convolute and retuse; sepals scarlet, oblong, acute, exceeding the petals; pedicels axillary, nodding, puberulous. Summer, autumn. *l.* opposite, glabrous, on long petioles, remotely denticulated. Branches finely pubescent. *h.* 6ft. to 10ft. Mexico, 1823. See Fig. 51. (B. R. 847; B. M. 2507, under name of *F. decussata.*) There is a beautiful variegated form of this species.

F. m. pumila (dwarf). A variety with flowers much like *gracilis*, but of dwarfer habit. See Fig. 52.

F. magellanica (Magellan). A synonym of *F. macrostema.*

FIG. 53. FLOWERING BRANCH AND SINGLE FLOWER OF FUCHSIA MICROPHYLLA.

F. microphylla (small-leaved).* *fl.*, petals deep red, retuse, toothed; calyx scarlet, funnel-shaped, with ovate-acuminate lobes; pedicels axillary. Autumn. *l.* opposite, small, elliptic-oblong, acutish, toothed, glabrous. Branches pubescent. *h.* 2ft. Mexico, &c., 1828. See Fig. 53. (B. R. 1269.)

F. paniculata (panicled). A synonym of *F. arborescens.*

F. penduliflora (pendent-flowered).* *fl.* in axillary and terminal clusters; tube rich crimson, shaded with maroon, 3in. to 4in. long, trumpet-shaped. March. *l.* 3in. to 4in. long, ovate, acuminate, glabrous. Tropical America, 1879. (F. M. n. s. 412.)

F. procumbens (procumbent).* *fl.* small, erect; tube yellowish, upper portion reflexed, blue. *l.* small, round. New Zealand, 1874. This exceedingly pretty little hardy creeper is principally grown on account of its large, oval, magenta-crimson berries, which remain on for months, and are very attractive during the winter. It is an admirable plant for a suspending basket. (B. M. 6139.)

F. serratifolia (saw-edge-leaved). *fl.*, petals scarlet, ovate-oblong; sepals red, rather villous, 1½in. long, exceeding the petals, somewhat tumid at the base; pedicels axillary, drooping. Summer. *l.* in whorls of three or four, narrow, oblong, acute, glandularly toothed. Branches furrowed, reddish. *h.* 6ft. to 8ft. Peru, 1844. See Fig. 54. (B. M. 4174.)

F. sessilifolia (sessile-leaved). *fl.* panicled; petals red; sepals pink and green. June. *l.* oblong-lanceolate, opposite or whorled, with terminal, pendulous, leafy racemes. Columbia, 1865. A pretty shrub. (B. M. 5907.)

F. simplicicaulis (slightly-branched).* *fl.* rose-scarlet, one in the axil of each bract, pendent, numerous, handsome; petals ovate, acute, shorter than the sepals. October. *l.* ternate on the main stem and branches, 4in. to 5in. long, much smaller upon the pendulous, elongated, flowering branches; ovate, approaching to lanceolate, a little polished above, entire, on very short petioles; those of the bracts sessile. Peru, 1858. A very beautiful plant. (B. M. 5096.)

Fuchsia—*continued.*

F. spectabilis (showy). *fl.*, peduncles red, axillary, solitary, single-flowered, shorter than the leaves; calyx bright red, tube swollen at the base; petals deep red, large, nearly orbicular, waved, very patent, and pressed, as it were, upon the segments of the calyx. September. *l.* mostly ternate, 6in. to 8in. long, between ovate and elliptical, petiolate, not tapering at the base, acute or slightly acuminate at the points, obscurely ciliated, entire at the margin, or only having minute tooth-like processes, occasioned by the presence of small oblong glands; petiole erect or spreading; stipules triangular between the petioles. *h.* 2ft. to 4ft. Andes of Cuenca. A moderate-sized handsome shrub. (B. M. 4375.)

FIG. 54. FLOWERING BRANCH OF FUCHSIA SERRATIFOLIA.

F. splendens (splendid).* *fl.* scarlet and green, very showy. Early summer. *l.* ovate-cordate, pale green. *h.* 6ft. Mexico, 1841. This is one of the best and most distinct of the greenhouse species. (B. M. 4082.)

F. syringæflora (Syringa-flowered). A synonym of *F. arborescens.*

F. thymifolia (Thyme-leaved).* *fl.* red; petals obovate-oblong, undulated; calyx funnel-shaped, with oblong-acute lobes; pedicels axillary. Summer. *l.* about opposite, small, ovate or roundish-ovate, obtuse, nearly entire, downy above, nearly smooth beneath. *h.* 4ft. to 6ft. Mexico, 1827. (B. R. 1284.)

F. triphylla (three-leaved).* *fl.* glowing cinnabar-red, about 1½in. long, in terminal, nodding racemes; petals shorter than the sepals. *l.* small, 1½in. to 3in. long, purplish beneath, and traversed by numerous lateral veins that curve round and run into each other near the margin. *h.* 1ft. to 2ft. West Indies. A handsome ornamental plant. (B. M. 6795.)

F. venusta (charming). *fl.*, petals scarlet, oblong-lanceolate, acute, with undulated margins; sepals purple, about the same shape and length as petals; pedicels axillary; upper ones racemose. August. *l.* opposite, and three in a whorl, elliptic, acute, entire, glabrous. Branches downy. *h.* 4ft. Central America, 1825. (F. d. S. 538.)

VARIETIES. These are very numerous, and are annually increased by others, representing a difference either in form, size, or colour. Many of the old varieties can scarcely be excelled in their general floriferous habit; but those more recently raised have a remarkable variation in shape and length of flowers. The subjoined list includes a selection of the best for general cultivation.

Varieties with Single Flowers. ALBA COCCINEA, tube cherry-coloured, sepals white, corolla rose, very distinct; AURORA SUPERBA, rich salmon, corolla scarlet; BEAUTY OF CLYFFE HALL, tube and sepals blush-white, corolla rich carmine-pink, large and free; BEAUTY OF SWANLEY, tube and sepals white, corolla pink; BEAUTY OF TROWBRIDGE, tube and sepals white, corolla light, good; BLAND'S NEW STRIPED, tube and sepals scarlet, corolla plum-colour, striped rose; CANNELL'S GEM, tube and sepals glowing red, corolla pure white, cupped, good; CHARMING, tube and sepals red, corolla dark, showy and effective; DELIGHT, tube and sepals crimson, corolla bell-shaped, pure white, free and good; EARL OF BEACONSFIELD, rosy-carmine, corolla deep carmine, one of the best (this is a very remarkable hybrid—the seed-bearing parent being *F. fulgens*—raised, several years ago, by Mr. Laing; hitherto it has remained quite sterile) (see Fig. 55); ERECTA SUPERBA, a curious strong-growing garden hybrid, with flowers nearly erect (see Fig. 56); ETHEL, tube and sepals pure white, corolla violet; GAZELLE, dark red, a floriferous variety, of good habit; GENERAL GARFIELD, rich crimson, sepals broad, reflexed, corolla bluish; GRAND DUCHESS MARIE, tube white, corolla

Fuchsia—*continued.*

FIG. 55. FUCHSIA EARL OF BEACONSFIELD.

rose, free and good; INIMITABLE, sepals scarlet, broad, finely reflexed, corolla deep violet; JAMES LYE, tube and sepals red, corolla deep violet, good dark variety; JEANNE D'ARC, tube and sepals bright red, corolla pure white, extra good; JULES FERRY, scarlet, corolla violet, mottled white; LADY

FIG. 56. FLOWERING BRANCH OF FUCHSIA ERECTA SUPERBA.

Fuchsia—*continued.*

HEYTESBURY, white, corolla purple, free; LORD BYRON, bright crimson, corolla very dark, bell-shaped; LORD WOLSELEY, sepals broad, deep red, corolla rosy-crimson, margined purple, extra fine; LYE'S RIVAL, tube and sepals red, corolla violet-purple, very free; MARGINATA, white, corolla pink, margined with scarlet, of fine habit; MIGNONNE, tube and sepals bright red, corolla pure white, one of the best of its class; MR. J. HUNTLY, red, corolla plum-colour, showy dark variety; MRS. E. BENNETT, scarlet, corolla white, free; MRS. J. LYE, tube and sepals white, corolla pink, habit branching; MRS. KING, white,

FIG. 57. FLOWER OF FUCHSIA GIPSY QUEEN.

corolla rich carmine, good; MRS. MEIN, tube and sepals crimson-scarlet, latter well reflexed, corolla white; PINK PERFECTION, creamy-white, corolla violet; ROSE OF CASTILE, sepals blush, corolla purplish, good old variety; SEDAN, dark self-coloured variety, distinct and good; STAR OF WILTS, cream, corolla violet, very fine; SUNRAY, scarlet, corolla light purple, leaves crimson, bronze and white, very ornamental; THOMAS KING, tube and sepals coral-red, corolla rich deep purple; WAVE OF LIFE, sepals scarlet, corolla violet, a good old variety with yellow foliage.

FIG. 58. FLOWER OF FUCHSIA MISS LUCY FINNIS.

Varieties with Double Flowers. ALFRED DUMESNIL, sepals clear crimson, corolla pale violet, long; AVALANCHE, carmine, corolla dark purple, one of the best doubles; CHAMPION OF THE WORLD, coral-red, corolla dark purple, produces, when fully developed, the largest flowers of any variety known; DE MONTALIVET, rosy-carmine, corolla violet, flaked, small full flower; GEM OF IPSWICH, tube and sepals coral-red, corolla purple, striped; GENERAL, sepals deep rose, much reflexed, corolla rich violet, striped; GIPSY QUEEN, sepals scarlet and much

Fuchsia —*continued.*

reflexed, corolla very full, violet (see Fig. 57); KING OF THE DOUBLES, scarlet, corolla purple, striped; KINGSBURYANA, scarlet, corolla pure white, and remarkable for its size and shape; LE CYGNE, tube and sepals crimson, corolla white, dwarf; LITTLE ALICE, scarlet, corolla pure white, good; MARKSMAN, sepals carmine, corolla violet, habit good; MARVELLOUS, tube and sepals rose, corolla blue, full; MILNE EDWARDS, coral-red, corolla bluish-violet; MINSTREL, rosy-crimson, corolla ivory-white, striped, full; MISS LUCY FINNIS, tube and sepals coral-red, corolla pure white, large and very full (see Fig. 58); MISS L. VIDLER, sepals crimson, corolla violet, good; MRS. H. CANNELL, sepals bright crimson, broad, corolla pure white, extra fine; NELLY MORTON, scarlet, corolla white; PIERRE JOIGNEAUX, sepals light red, corolla deep carmine, peculiarly formed.

FUEL AND FURNACES. The necessary annual supply of Fuel for heating purposes forms a considerable and very important item in garden expenditure. The bulk of that used in old-fashioned flues was coal, either as supplied from the pit or mixed with cinders. Since the introduction and general adoption of heating by hot water, coke has become a substitute in most cases where it can be obtained. The use of coal in large boilers would soon choke the flues with soot, and this is one important objection. Various gases are removed with the smoke in the manufacture of coal gas for burning, and the coke which remains contains about two-thirds of carbon, and forms the strongest heating combustible material available in quantity for horticultural purposes. The large pieces and those of medium size are of the best quality; the small, generally termed "breeze," being much inferior, and sold at a lower price. Combustion is first caused by heat, and it increases as the heat becomes more intense. A certain quantity of Fuel consumed inside a Furnace, transmits the heat evolved by combustion to the boiler, &c., surrounding it, or, if allowed, a great part passes to the chimney, where it is completely wasted. A draught, caused by the opening of the damper and ash-pit door at the same time, is a means whereby much oxygen is admitted to the fire, and a passage opened for the escape of the ascending heat. This is one of the principal things to avoid by using the damper, so that the greatest possible amount of heat may be utilised, with, at the same time, an economical use of Fuel in proportion.

FUGACIOUS. Lasting but a short time.

FUGOSIA (named in honour of Bernard Cienfugos, a Spanish botanist of the sixteenth century). SYNS. *Cienfuegia*, *Cienfugosia*, and *Redoutea*. ORD. *Malvaceæ*. A genus comprising about a score species of greenhouse evergreen shrubs or sub-shrubs, natives of tropical America, Africa, and Australia. Flowers often yellow, surrounded by an outer calyx or involucel of six or more leaves, within which is a five-cleft calyx dotted over with black spots, and five oblique petals. Leaves entire or lobed, rarely partite. Fugosias succeed in a peat and loam soil, to which a little silver sand may be added. Propagated by cuttings, made in April or May, and inserted under a bell glass, in mild bottom heat. The species here described are those usually seen in cultivation.

F. cuneiformis (wedge-shape-leaved). *fl.* red; petals about 1½in. long, slightly tomentose; involucre very small, minutely five or six-toothed, placed a little below the calyx; peduncles short and thick. June to August. *l.* cuneate-oblong or broadly linear-obtuse, 1in. to 2in. long, entire, thick and somewhat fleshy. *h.* 15ft. West Australia. Shrubby and glabrous. SYNS. *Hibiscus cuneiformis* and *Lagunaria cuneiformis*.

F. hakeæfolia (Hakea-leaved). *fl.* purple-lilac, large, on axillary peduncles, articulate, and often bearing a small bract about the middle; petals 1½in. to 2in. long. August. *l.* from deeply bipinnatifid to trifid only, or the upper ones entire, often several inches long, the whole leaf or lobes narrow-linear, somewhat fleshy, grooved above or almost terete. *h.* 8ft. to 10ft. South Australia, 1846. An erect shrub. (B. M. 4261.) SYNS. *Hibiscus hakeæfolius* and *H. multifidus* (P. F. G. vii. 103).

F. heterophylla (various-leaved). *fl.* yellow, with purple claws. June. *l.* ciliated, elliptical, entire, rarely trifid. *h.* 3ft. South America, 1822. SYN. *Redoutea heterophylla*. (B. M. 4218.)

FULIGINOUS. Dirty brown, verging upon black.

FULLER'S TEAZEL. *See* **Dipsacus Fullonum.**

FULVOUS. Dull yellow, with a mixture of grey and brown.

FUMANA. This genus is now included, by most authorities, under **Helianthemum** (which *see*). It forms a distinct section of that genus, and is characterised by its yellow flowers, narrow linear leaves, and erect habit.

FUMARIA (Spanish *fumaria*, from *fumus*, smoke; in allusion to the disagreeable smell of the plant, or to its poetical name, Smoke of the Earth). Fumitory. Including *Discocapnos* and *Platycapnos*. ORD. *Fumariaceæ*. A genus of perhaps a score species of annual (rarely perennial) herbs, usually branched, often climbing. Flowers small, in terminal or leaf-opposed racemes; petals four, erect, conniving, the posterior gibbous or spurred at the base, the anterior flat, two inner narrow, cohering by their tips, winged or keeled at the back. Leaves much divided; segments very narrow. No less than four species of this genus are found in Britain, but that described below is the only one worth growing. They are all of the easiest possible cultivation. Seeds may be sown in any ordinary soil, in spring.

F. capreolata (tendrilled).* *fl.* whitish, tinged with dark purple; spur compressed, blunt, short, mitre-formed; racemes oblong. May to September. *l.* bipinnate; petioles somewhat tendrilled. *h.* 4ft. Europe (Britain), Asia.

F. formosa (beautiful). A synonym of *Dicentra formosa*.

FUMARIACEÆ. An order of herbs, now included, by Bentham and Hooker, as a tribe of *Papaveraceæ*. Flowers irregular; sepals two, deciduous; petals four, in two usually very dissimilar pairs, cruciate, irregular, one or both of the outer pairs often saccate or spurred, and the two inner frequently cohering at the apex so as to include the anthers and stigma. Leaves alternate, usually divided, exstipulate. Stems brittle. The species possess slight bitterness and acridity, and are natives of the temperate and warm regions of the Northern hemisphere and of Southern Africa. Five of the seven genera are: *Adlumia*, *Corydalis*, *Dicentra*, *Fumaria*, and *Hypecoum*. There are about 100 species.

FUMIGATING. The process of destroying insects, principally Thrips and various Aphides, by means of tobacco smoke. Tobacco itself is seldom used for the operation, being too expensive. The various preparations supplied by nurserymen, or other firms of repute, as Fumigating mixtures, answer the same purpose most effectually. They are manufactured by soaking brown paper, pieces of rag, &c., in a strong solution of tobacco juice, and afterwards drying them for use. Only that which is known to be of good quality should be used, as valuable plants may be either injured or destroyed by the effects of smoke from material prepared from a solution containing injurious ingredients. A dull, still evening is best for Fumigating in any house or frame, as the smoke does not then escape so quickly. The leaves of the plants should, if possible, be dry at the time. The amount of smoke that may be allowed with safety, must depend on the hardiness of the subjects to withstand it. As a rule, it is always safer to moderately fill the structure on one evening, and again on the following morning, or on two successive evenings, than to run the risk of applying too much at once, with the intention of not repeating the operation. Fumigating may be practised with advantage, more as a preventative to the increase of insects, especially in spring. Care should be taken never to allow sunshine on a house with smoke inside, or tender plants are certain to be scorched. If still, rainy weather be selected, this is always avoided.

Fumigators are manufactured of various descriptions, but are not much used in large establishments, an open iron vessel, having a cross handle and a grating at the bottom, or some other means of a similar kind, being employed with equally good results. Most of the preparations of tobacco paper now sold burn without the use of bellows; consequently, the operator need not remain

Fumigating—*continued*

inside the house if the vessel containing the fire is placed near the door and carefully watched from the outside. The most important point is not to allow the material to flame. Some Fumigators have a perforated lid to prevent this. A layer of damp moss may also be used for a similar purpose where there is danger of ignition.

FUMITORY. *See* **Fumaria.**

FUNERAL CYPRESS. A common name of **Cupressus funebris** (which *see*).

FUNGI. A large class of cryptogams, distinguished from algæ more by habit than by any general character.

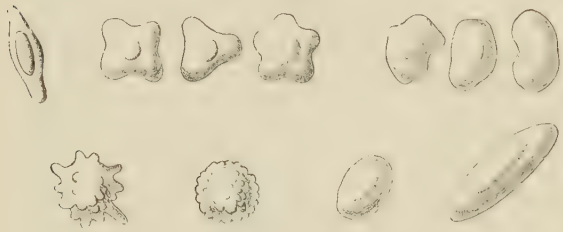


FIG. 59. SPORES OF FUNGI (AGARICUS).

"They are polymorphous, (often) ephemeral, annual or perennial, never green; composed either of filaments, or of a loose or close tissue, pulpy or fleshy, rarely woody; sometimes furnished with peculiar vessels, containing a white, yellow, or orange milky juice. They grow above or under ground, on decomposing vegetable or animal matter, or are parasites on vast numbers of phænogamous plants, and even on other Fungi. They are very rarely found on stones, or in water. In no particular can they be compared with phænogams, having no organs comparable with leaves and flowers. Among acotyledons, they approach algæ in their vegetation, and lichens in their fructification, but they have no fronds. Fungi have nearly the same geographical distribution as lichens; they are met with in the tropics, and in the coldest regions of both hemispheres, at the top of the highest mountains, beyond phænogamic

FIG. 60. CANDLESNUFF FUNGUS (XYLARIA HYPOXYLON).

vegetation. The smell of Fungi is not generally strong, and might be termed fungoid when it is mild and pleasant, like that of the Mousseron (*Agaricus albellus*). They are usually mild, and not very pleasant to the taste. Some are so extremely acrid that it would be dangerous to retain much of them in the mouth; however, this acridity disappears when they are properly cooked. Many species, as Truffles, Morels, and certain Agarics, are edible, and much sought after. Many others, which strongly resemble the preceding, and which nearly all belong to the genera *Agaricus* and *Lactarius*, are poisonous. To distinguish between edible and poisonous Fungi is a very difficult matter" (Léveillé). With the exception of the Ergot of Rye or Wheat, Fungi are now seldom employed in medicine. Fig. 59 shows spores of a number of species of the huge genus *Agaricus*. Most of the species of this genus have colourless spores, but in some they are pink, brown, or black; they are very variable in size; some, also, are smooth, whilst a few are rough or nodulose—especially amongst those in which the colour is pink. Fig. 60 represents the Candlesnuff Fungus which is frequently seen on decaying wood. Some of the minute Fungi—such as the *Peronospora infestans*, which attacks the potato and other Solanaceous plants—are extremely destructive, and amongst the worst pests against which the gardener has to contend.

Fungi—*continued.*

FUNKIA (named after H. Funck, 1771-1839, a German botanist). Plantain Lily. SYNS. *Hosta*, *Saussurea* (of Salisbury). ORD. *Liliaceæ*. All the species of this genus (according to Mr. Baker) are described below. They are handsome, hardy, herbaceous plants. Flowers solitary in the axils of the bracts, forming a raceme. Leaves broadly ovate or cordate. Roots tuberous, fascicled. These fine plants are admirably adapted for the lawn, shrubbery border, beds, or rockwork; and, when grown in pots, they form very effective subjects for the greenhouse or conservatory. They thrive best when the ground, in which they are to be grown, is deeply dug, and well enriched with rotten manure. Propagation may be effected by cutting the crowns through with a sharp spade during winter, or when they begin to start

FIG. 61. FUNKIA SIEBOLDIANA.

Funkia—*continued.*

in spring. The latter season is, perhaps, the most suitable, as the mutilated parts then quickly heal. None but strong, healthy clumps should be divided, and each portion should comprise several crowns. The genus is in a state of much confusion, from the number of garden varieties and synonyms.

F. Fortunei (Fortune's). *fl.*, perianth pale lilac, funnel-shaped, 1½in. long, the lanceolate ascending divisions half as long as the tube. July. *l.* six or eight to a stem; blade cordate-ovate, cuspidate, pale green on both sides, conspicuously and persistently glaucous, furnished with ten or twelve arching veins on each side, between the midrib and the margin. *h.* 1½ft. Japan, 1876.

F. grandiflora (large-flowered).* *fl.* fragrant; perianth pure white, nearly 4in. long, dilated gradually from a tube ¼in. thick; scape about 2ft. high, bearing a twelve to fifteen-flowered raceme. July to September. *l.* ovate, with a slightly cordate base, 8in. to 9in. long, 4½in. to 5in. broad; petiole 1ft. long; edges incurved until they meet. Japan. SYN. *F. japonica.* (F. d. S. 158; G. C. n. s., x. 629.)

F. japonica (Japanese). A synonym of *F. grandiflora.*

F. lancifolia (lance-leaved). *fl.*, perianth white or with a lilac tinge, 1in. to 1½in. long, dilated suddenly from a tube not more than a line in thickness; scape 8in. or 9in. high, slender, with the raceme hardly, if at all, overtopping the leaves; raceme 3in. to 5in. long, six to ten-flowered. August. *l.* green, lanceolate, 4in. to 5in. long, 1½in. to 2in. broad, narrowed gradually towards both ends; petiole 6in. to 9in. long; edges not incurved. Japan, 1829. (B. M. 3663.) *F. albo-marginata* only differs by its rather larger flowers and leaves, slightly variegated towards the edge with white. *F. undulata* is another garden form with irregularly frilled or crisped leaves, which are copiously variegated with streaks or large patches of white.

F. ovata (ovate).* *fl.*, perianth bluish-lilac or white, 1½in. to 2in. long, dilated suddenly from a tube ¼in. in thickness; scape 1ft. to 1½ft. long, overtopping the leaves; raceme ten to fifteen-flowered. May. *l.* ovate, 5in. to 9in. long, 3in. to 5in. broad; petiole 4in. to 12in. long; edges not incurved. Japan, Northern China and Eastern Siberia, 1790. The commonest and best-known species. SYN. *Hemerocallis cærulea.* (B. M. 894.)

F. o. marginata (margined).* A variety in which the leaves are broadly margined with white.

F. Sieboldiana (Siebold's).* *fl.*, perianth white, with a pale lilac tinge, 2in. to 2½in. long; scape with the raceme not overtopping the leaves; racemes 4in. to 6in. long, ten to fifteen-flowered. June. *l.* glaucous, broadly cordate-ovate, 10in. to 12in. long, 7in. to 8in. broad; petiole 8in. to 12in. long, edges not incurved. Japan, 1836. See Fig. 61. (B. R. 1839, 50.)

FIG. 62. FUNKIA SUBCORDATA.

F. subcordata (sub-cordate).* *fl.*, perianth pure white, 4in. to 4½in. long, gradually dilated from a tube ¼in. in thickness; scape 1½ft. to 2ft. long; raceme nine to fifteen-flowered. August. *l.* cordate-ovate, pale green, 6in. to 9in. long, 3in. to 5in. broad; petiole 6in. to 8in. long. Japan, 1830. SYNS. *Hemerocallis alba* (A. B. R. 194), *H. cordata*, *H. japonica* (B. M. 1433), *H. plantaginea.* See Fig. 62.

FURCATE. Forked.

FURCRÆA (named in honour of A. F. Fourcroy, 1755-1809, a celebrated French chemist). SYN. *Fourcroya.* ORD. *Amaryllideæ.* A genus of about fifteen species of very noble greenhouse or stove plants, closely allied to *Agave*, but with horizontally spreading perianth segments. For culture, &c., *see* **Agave.**

Furcræa—*continued.*

F. Bedinghausii (Bedinghausen's).* *fl.* greenish; scape 12ft. to 15ft. high; branches drooping. *l.* thirty to fifty in a rosette, lanceolate, about 3ft. long; margin minutely denticulate. Trunk 3ft. high. Mexico, 1860. SYNS. *Roezlia regia*, *Yucca argyrophylla*, *Y. Parmentieri*, *Y. Toneliana.*

FIG. 63. FURCRÆA CUBENSIS, showing Inflorescence, with Bulbils developed instead of Flowers.

F. cubensis (Cuban).* *fl.* greenish. Autumn. *l.* twenty-five to thirty in a rosette, bright green, rigid in texture, channelled and smooth down the face, generally scabrous on the back, the end a minute brown, scarcely pungent point; edge armed with regular hooked brown prickles. Tropical America, 1879. One of the commonest and best known of all the species. See Fig. 63.

F. c. inermis (unarmed). This plant differs from the ordinary *F. cubensis* by its less rigid leaves, and by the total or almost entire suppression of the marginal teeth, which in the type are very close and large, and armed with pungent horny brown spines. Tropical America. (B. M. 6543.)

F. elegans (elegant).* *fl.* greenish-white; scape 20ft. to 25ft. high. *l.* forty to fifty in a rosette, lanceolate, 5ft. to 6ft. long; prickles brown, hooked, horny. Mexico, 1868. Plant stemless. SYNS. *F. Ghiesbreghtii*, *F. pugioniformis.*

F. flavo-viridis (yellow-green). *fl.*, perianth pale yellowish-green; tube incorporated with the obtusely triangular ovary; scape 12ft. to 14ft. high, naked below, but bracteated above, forming a long, loose, racemose panicle. *l.* radical, more or less spreading, and somewhat tortuose, lanceolate, pungently acuminate, spinulose at the margin. *h.* 14ft. Mexico, 1846. (B. M. 5163.)

F. fœtida (fœtid). A synonym of *F. gigantea.*

F. Ghiesbreghtii (Ghiesbreght's). A synonym of *F. elegans.*

F. gigantea (gigantic).* *fl.* milk-white inside, greenish on the back outside; scape 20ft. to 30ft. high. *l.* forty to fifty in a dense

Furcræa—*continued.*

rosette, lanceolate, 4ft. to 6ft. long; margin usually entire. Trunk 2ft. to 4ft. high. South America, 1690. SYN. *F. fœtida.* See Figs. 64 and 65.

FIG. 64. FURCRÆA GIGANTEA.

F. longæva (long-lived).* *fl.* whitish; scape 30ft. to 40ft. long; branches spreading, compound. *l.* numerous, in a dense rosette, lanceolate, 4ft. to 5ft. long. Trunk about 3ft. to 4ft., but, in a wild state, said to reach 40ft. to 50ft., in height. Mexico, 1833. This is probably the handsomest species of the genus; it is perfectly hardy in the open at the Scilly Isles, where it has frequently flowered. (B. M. 5519.)

F. pugioniformis (dagger-shaped). A synonym of *F. elegans.*

F. Selloa (Sello's). *fl.* white, tinged with green; scape 15ft. to 16ft. long; panicle 3ft. broad. *l.* thirty to forty in a dense rosette, lanceolate, 3ft. to 4ft. long; margin with upcurved brown spines about ¼in. long. Trunk none or scarcely any. (B. M. 6148.)

F. undulata (waved).* *fl.* all drooping, usually in pairs; perianth pale green; segments narrow-oblong, obtuse, obtusely keeled down the centre. November. *l.* forming a flat crown 3in. in diameter, not very numerous, strict, spreading, thick, ensiform, long acuminate, terminated by a pungent chestnut-brown spine, obscurely keeled at the back, which is scabrid; margin sub-undulate, with incurved chestnut-coloured stout spines. Stem none, or very short. *h.* 10ft. Mexico, 1868. (B. M. 6160.)

FURFURACEOUS. Scaly, mealy, scurfy.

FURNACES. *See* **Fuel and Furnaces.**

FURZE. *See* **Ulex europæus.**

FUSIFORM. Spindle-shaped, like the root of a Carrot.

GÆRTNERA (named after Dr. Joseph Gærtner, a celebrated German botanist, 1732-1791). SYNS. *Frutesca, Sykesia.* ORD. *Loganiaceæ.* A genus containing about twenty-five species of handsome stove glabrous shrubs or trees, natives of West Africa, Mauritius, Madagascar, and the Malayan Islands and Peninsula. Flowers white, green, or rose-coloured; in some species, not unlike those of the common Privet, and arranged in a similar manner; in others, disposed in compact terminal heads; and in others in corymbs; calyx usually very minute. Leaves opposite, entire, coriaceous, penniveined. They thrive in a mixture of loam and peat. Cuttings of firm shoots, made in April, will root, if inserted in sand, under a hand glass, in heat. The species here described are those best known in cultivation.

G. obtusifolia (obtuse-leaved). *fl.* composed of five petals, the lower two more expanded, the upper three completely reflexed, the uppermost one has a rosy tinge round a yellowish base, the other four are white; fragrant. March. *l.* oblong, obtuse. *h.* 20ft. China, 1810. A large shrub.

G. racemosa (racemose).* *fl.* somewhat resembling *G. obtusifolia*, but larger, more beautiful, and exceedingly fragrant; exterior petals oblong. April. *l.* ovate-oblong, acute. Various parts of India, 1793. A very handsome species. (A. B. R. 600.)

GAGEA (named after Sir Thomas Gage, a British botanist, who died at Rome in 1820). ORD. *Liliaceæ.* A genus of about a score species of hardy bulbs, natives of Europe, temperate Asia, and Northern Africa; formerly

FIG. 65. BRANCH OF INFLORESCENCE, AND SINGLE FLOWER, OF FURCRÆA GIGANTEA.

Gagea—*continued.*

included under *Ornithogalum*. Flowers greenish-yellow, on a scape, in a terminal bracteated umbel. Leaves radical, linear. The species closely resemble each other; but few of them, however, are seen in gardens. For culture, *see* **Ornithogalum.**

G. lutea (yellow).* Yellow Star of Bethlehem. *fl.* three or four in a flat raceme, almost contracted into an umbel; the leaf-like bracts as long as the pedicels or longer; perianth segments yellow, with a green back, very spreading, narrow-oblong. Spring. *l.* one, or very rarely two, linear, pointed and curved like those of a Tulip. Stem slender, rarely 6in. high. Europe and Russian Asia, except the extreme North; also occurring in several parts of England, and, but rarely, in the Lowlands of Scotland. (Sy. En. B. 1522.)

G. stenopetala (narrow-petaled). *fl.* in umbels; perianth pale yellow, deeply six-parted. March. *l.*, root ones solitary, glaucous, revolute, linear-lanceolate, acute, strongly three-nerved; scape leaves opposite, lanceolate, acute, sharply keeled, glaucous, pubescent, and fringed with long hairs. Europe. (S. B. F. G. 177, under name of *G. glauca*.)

GAGNEBINA (named in honour of P. Gagnebin, a botanical writer of the seventeenth century). ORD. *Leguminosæ*. An elegant, unarmed, stove evergreen shrub, closely allied to **Mimosa** (which *see* for cultivation).

G. tamariscina (Tamarix-like). *fl.* yellow; spikes crowded at the top of the branches, disposed in a kind of racemose corymb. *l.* with about twenty pairs of pinnæ, each pinna bearing about thirty pairs of leaflets. *h.* 6ft. Mauritius, 1824.

GAILLARDIA (named in honour of M. Gaillard, a French patron of botany). ORD. *Compositæ*. A genus of very ornamental hardy annual or perennial herbaceous plants, natives of North and extra-tropical South America. Flower-heads yellow or purple, 2in. across, single, and supported on naked stalks; ray-florets three to five-toothed, often two-coloured; receptacle furnished with filiform bristles between the florets. Leaves sometimes pinnatifid, but usually entire or obscurely toothed, lance-shaped and rough; the cauline ones sessile. There are about eight species, all thriving in a good light friable soil, in masses. Propagation may be effected by cuttings, in autumn or spring; also by division, in the latter season. In cold localities, the perennial species frequently die in winter: in this case, seeds should be sown on a mild hotbed, in February or March. The best

FIG. 66. FLOWERING BRANCH OF GAILLARDIA ARISTATA GRANDIFLORA.

Gaillardia—*continued.*

method of propagating the annuals is by cuttings, which are readily obtainable, as these form far superior plants to those procured from seed.

G. amblyodon (blunt-toothed).* *fl.-heads* terminal, peduncled; ray-florets deep blood-red, twelve to fourteen, spreading; limb cuneate-oblong, obtusely three-lobed; disk-florets short. October. *l.*, radical ones sub-spathulate; cauline ones semi-amplexicaul, oblong, sub-acute, coarsely toothed beyond the middle, usually contracted below it. *h.* 2ft. to 3ft. Texas, 1873. Annual. (B. M. 6081.)

G. aristata (awned).* *fl.-heads* yellow, with prominent exserted reddish styles in the disk, 1in. to 3in. across. Autumn. *l.* lanceolate, entire, or remotely toothed. *h.* 1½ft. United States, 1812. Perennial. (B. M. 2940.) There are several very handsome varieties of this species; notably *grandiflora* (see Fig. 66), (GN., Dec. 13, 1884), and *grandiflora maxima*.

G. pulchella (neat).* *fl.-heads* larger than those of the first-named species; ray-florets crimson, tipped with bright yellow. Autumn. *l.* coarsely and sparsely toothed. *h.* 2ft. to 3ft. Annual. (B. M. 1602, under name of *G. bicolor*.) A new form, named *Lorenziana*, is very handsome and unique in appearance: the ray and disk-florets develop themselves into tubular funnel-shaped three to five-lobed florets, and form handsome flower-heads, which are admirably adapted for cutting. Another variety, *nana*, is a fine free-flowering form of good compact habit, and with large flowers, which are reddish-crimson, bordered with citron-yellow.

G. p. picta (painted).* A form with somewhat succulent leaves, and the more or less subulate fimbrillæ of the receptacle shorter and stouter. (B. M. 3368, under name of *G. bicolor Drummondii*.)

The following are mere garden names for slightly-varying forms of the foregoing species: *Bosselari*, *coronata*, *hybrida*, *Loiselli*, *Richardsoni*, and *Telemachi*. *G. pinnatifida* is a species not often seen in cultivation.

GALACTIA PINNATA. A synonym of *Barbieria polyphylla*.

GALACTITES (from *gala*, *galaktos*, milk; in allusion to the veins of the leaves being milk-white). ORD. *Compositæ*. A genus of hardy annual or biennial erect herbs, nearly allied to *Cnicus*, from which it differs chiefly in the outer florets of the flower-head being sterile and larger than the others, as in *Centaurea*. Leaves pinnatifid, with spiny-pointed segments, spotted with white above, and covered with cotton-down below. There are three species, all inhabiting the Mediterranean region. They thrive in any common garden soil, and may be propagated by seed, sown in the flower border, in March or April. The species here described is the one best known to cultivation.

G. tomentosa (woolly). *fl.-heads* purple, pedunculate. July. *h.* 1½ft. 1738. This species is remarkable among the thistles for having a milky juice, similar to that so frequently found in the Chicory group.

GALACTODENDRON (from *gala*, milk, and *dendron*, a tree; in reference to the copious milky juice). Cow-tree. ORD. *Urticaceæ*. This genus is now usually referred to *Brosimum*. It is only met with in botanic gardens.

G. utile (useful), the Palo de Vaca, first described by Humboldt, is a native of Venezuela, where it forms large forests, and attains a height of upwards of 100ft., with a smooth trunk, 6ft. or 8ft. in diameter. On incisions being made in the trunk, the natives obtain an abundant supply of milky sap, which is extensively employed by them as a substitute for milk. (B. M. 3723, 3724.)

GALANTHUS (from *gala*, milk, and *anthos*, a flower, in reference to the milk-white flowers). Snowdrop. ORD. *Amaryllideæ*. A well-known genus, containing three species of hardy bulbous plants. It is distinguished from *Leucoium* principally in having the three inner segments of the perianth shorter than the outer. Snowdrops are well-known and general favourites, on account of the modest beauty displayed by their flowers at the early season in which they appear; hence, no word of recommendation is needed to insure their cultivation, which is of the simplest description, as the roots thrive in almost any soil or position outside. When once planted, it is best to let them take care of themselves, as lifting has a tendency to dry the bulbs, which is not desirable if it can be avoided. Snowdrops are cheap and attractive subjects for naturalising in grass, by woodland drives, &c.,

Galanthus—*continued.*

as, if planted where the soil is suitable, and left alone, they increase rapidly, and annually appear to flower almost suddenly, about the beginning of February.

Pot Culture. If a number of roots are purchased with the ordinary Dutch bulbs in autumn, and about eight placed in a 5in. pot, an interesting addition may be ob-

FIG. 67. FLOWERS OF GALANTHUS ELWESII.

tained for greenhouse decoration in January. Snowdrops will not bear forcing, and, if it is attempted, failure in securing flowers is almost certain. After potting, they should be covered with ashes until growth commences. The pots should then be removed and kept in a light

FIG. 68. GALANTHUS NIVALIS.

Galanthus—*continued.*

FIG. 69. FLOWERS OF GALANTHUS NIVALIS IMPERATI.

position in a cold frame, giving plenty of air at all times when the weather is mild. Both the single and

FIG. 70. FLOWERS OF GALANTHUS NIVALIS REFLEXUS (CRIMEAN SNOWDROP).

Galanthus—*continued.*

double forms seldom fail to flower when treated in this way.

G. Elwesii (Elwes's).* *fl.*, petals (inner perianth segments) constricted above the middle, slightly notched at the apex, and marked with green spots at the base. *l.* twisted within the sheath, not folded. *h.* 6in. to 12in. Asia Minor, 1875. A very distinct large-flowered form, and said to be the finest of the genus. (B. M. 6166.)

G. nivalis (snowy).* Common Snowdrop. *fl.* with white perianth segments, the three inner streaked with green on the inside, and having a spot of the same colour on the outside, pendulous. *l.* keeled, linear, obtuse, usually in twos. Bulb ovate. *h.* 4in. to 6in. Europe. This well-known plant has a number of more or less distinct varieties. *Imperati* is a very large form, with outer segments of the flower very abrupt and narrow at the base (see Fig. 69) (G. C. n. s., xi. 237); *latifolius* (= *Redoutei*) differs only in its very broad strap-shaped leaves (G. C. n. s., xv. 404); *major*; *reflexus*, with outer perianth segments reflexed (see Fig. 70);

FIG. 71. FLOWERS OF GALANTHUS NIVALIS VIRESCENS.

Shaylockii (G. C. n. s., xi. 343); and *virescens*, with inner segments all over green (see Fig. 71), are varieties. There is also a well-known double form.

G. plicatus (folded).* *fl.* somewhat similar to those of *G. nivalis*, but sometimes smaller, and of a greenish hue. *l.* with a longitudinal fold on both sides near the edge, whence the specific name. *h.* 6in. Crimea, 1818. This rare species is, with the exception of the flower, larger in all its parts than *G. nivalis*, but is not, however, so pretty. (B. M. 2162; G. C., n. s., xi. 236.)

GALATELLA. This genus is now included, by Bentham and Hooker, under *Aster*.

GALAX (from *gala*, milk; referring to the milk-white flowers). SYNS. *Erythrorhiza* and *Solenandra*. ORD. *Diapensiaceæ*. An elegant little hardy herbaceous perennial, particularly suitable for growing on rockwork. It thrives best in a compost of nearly all leaf mould, rather damp, with the addition of a small quantity of loam and charcoal, but will succeed in almost any soil, in a cool, damp place. Propagated by divisions of well-grown clumps, in autumn.

G. aphylla (naked-stemmed).* *fl.* white, small, numerous, produced at the apex of the slender, elongated, naked scape, in a loose, spicate raceme. July. *l.* round-cordate, thickly crenate-dentate, veiny, thin, but persistent over winter, rather shining, long-petioled. *h.* 3in. to 6in. North America, 1756. See Fig. 72. (B. M. 754; A. B. R. 343, under name of *Blandfordia cordata*.)

FIG. 72. GALAX APHYLLA, showing Habit and detached Inflorescence.

GALAXIA (from *gala*, *galaktos*, milk; referring to the juice). ORD. *Irideæ*. A genus of two or three species of very pretty greenhouse bulbous plants, natives of the Cape of Good Hope. Flowers, perianth funnel-shaped, with a slender terete tube, and a six-parted, equal limb of oblong, wedge-shaped, spreading segments. Leaves linear or rather broad, sheathing at the base. The species will succeed out of doors, planted in a warm, sheltered spot, if afforded some slight protection in winter; it is, however, safer to grow them in pots, in a cool greenhouse. They are of easy culture in sandy peat, with a little fibry loam added. Propagated by offsets.

G. graminea (grass). *fl.* light yellow; spathe one-valved, one-flowered. July. *l.* linear, filiform, dilated at base. 1795. Plant almost stemless. (B. M. 1292.)

G. ovata (ovate).* *fl.* dark yellow; spathe one-valved, one-flowered. May to September. *l.* oblong. 1799. Plant almost stemless. (B. M. 1208.)

GALBANUM. The name of an aromatic gum-resin issuing from the stems of several plants of the Carrot family, *Ferula galbaniflua* and *F. rubricaulis*, &c.

GALEANDRA (from *galea*, a helmet, and *aner*, *andros*, a stamen; referring to the crested male organ on the top of the column). ORD. *Orchideæ*. A genus of about half-a-score species of stove terrestrial orchids (included by some authors under *Eulophia*), natives of tropical America, from Brazil to Mexico; having slender, erect, fleshy, jointed stems, from the tops of which the flower-spikes are produced, just after the growth is finished. Leaves narrow, lanceolate, two-ranked, sheathing. The species are somewhat difficult to cultivate, and require strict attention during the growing season, in order to keep the leaves free from the attacks of Red Spider and Thrips. This may be done by syringing them twice a day in warm weather. Galeandras should be cultivated in pots of peat, in the East-Indian house. When growing, a plentiful supply of water should be given; but while at rest, they should be placed near the glass, in a Cattleya house, and kept moderately moist.

G. Baueri lutea (Bauer's yellow).* *fl.* yellow, beautiful, in drooping racemes; lip with parallel purple lines near the apex, which has wavy margins. June to August. *l.* veined, lance-shaped. Stems cylindrical. *h.* 6in. Guiana, 1840. A very rare but desirable species. (B. M. 4701.)

G. cristata (crested). *fl.* pink and dark purple; spike drooping. June to August. *h.* 1½ft. South America, 1844.

Galeandra—*continued.*

G. Devoniana (Duke of Devonshire's).* *fl.* white, elegantly pencilled with pink, about 4in. across, produced in pendent spikes from the top of the pseudo-bulbs. Blossoms at various times of the year, and remains a considerable period in full beauty. *h.* 2ft. South America. (B. M. 4610.)

G. Harveyana (Harvey's). *fl.*, sepals and petals sepia-brown; lip light yellow, with a tuft of hair over the anterior part of the disk. Tropical America.

G. minax (projecting). *fl.* yellowish-copper, whitish, purple. June. Columbia, 1874.

G. nivalis (snowy).* *fl.* in nodding racemes, each about 2in. long, with narrow reflexed rich olive-coloured segments, having a large funnel-shaped white lip, marked with a central violet blotch. Tropical America. A beautiful and rare species. (G. C. n. s., xvii. 537.)

GALEATE. Helmeted.

GALEGA (from *gala*, milk; referring to its supposed property of increasing the milk of animals which feed upon the plants). Goat's Rue. ORD. *Leguminosæ.* A genus comprising three species of ornamental, hardy, smooth, erect perennial herbs, natives of Southern Europe and Western Asia. Flowers white or blue, disposed in axillary and terminal racemes. Leaves impari-pinnate; leaflets entire, veined; stipules somewhat sagittate. The species succeed in almost any soil, but will well repay for liberal treatment. They succeed in rich loam, with a sunny situation, and can remain year after year in one position. It is, however, advisable to divide them every few years. Propagation is effected by dividing the roots into several strong pieces, and replanting them in a deeply dug soil, and in a position where they are intended to flower; or by seeds, sown in the open ground, in spring.

G. officinalis (officinal).* *fl.* blue; racemes longer than the leaves. Summer. *l.* lanceolate, mucronate, glabrous; stipules broad-lanceolate. *h.* 3ft. to 4ft. South Europe, 1568.

G. o. albiflora (white-flowered)* is a pretty white-flowered form. *h.* 2ft. to 3ft. Persia, 1823. SYN. *G. persica.*

FIG. 73. GALEGA ORIENTALIS, showing Flowering Stem and detached Single Flower.

G. orientalis (Eastern).* *fl.* blue; racemes longer than the leaves. Summer and autumn. *l.* ovate, acuminated, smooth; stipules

Galega—*continued.*

broad-ovate. *h.* 2ft. to 4ft. Caucasus, 1810. This species may be distinguished by its creeping roots and simple, flexuous stems. See Fig. 73. (B. M. 2192.)

G. persica (Persian). A synonym of *G. officinalis albiflora.*

GALEOBDOLON. Included under **Lamium.**

GALEOGLOSSUM. A synonym of **Prescottia** (which *see*).

GALEOLA (a diminutive of *galea*, a helmet; in allusion to the form of the labellum). Including *Cyrtosia*, *Erythrorchis*, &c. ORD. *Orchideæ.* A genus of about a dozen species of leafless epiphytes, sometimes climbing to a considerable extent. They are natives of India, Japan, the Malayan Archipelago, New Caledonia, and Australia. Flowers in terminal, usually pendulous, panicles. Some of the species are decidedly showy; but, probably, none are successfully cultivated in this country.

GALEOPSIS (the old Greek name used by Dioscorides, from *gale*, a weasel, and *opsis*, appearance; in allusion to the likeness of the flower to a weasel's snout). SYN. *Tetrahit.* ORD. *Labiatæ.* This genus, according to some authorities, contains twelve species of hardy, erect, or slightly decumbent, annual herbs; whilst others reduce the number of species to three. They are natives of Europe and West Asia. Flowers red, yellow, or variegated, sessile; calyx nearly regular, with five pointed teeth; corolla with a tube larger than the calyx. The species thrive in any ordinary garden soil, and are propagated by seed.

G. Ladanum (Ladanum). *fl.* purple, six to ten together, in dense whorls in the upper axils, the upper ones forming a terminal head. Summer and autumn. *l.* shortly stalked, narrow-ovate or lanceolate, coarsely toothed. *h.* 8in. to 9in. This species varies considerably in the breadth of leaf, in the degree of hairiness, and in the size of the flowers. (Sy. En. B. 1074, 1075.)

G. versicolor (various-coloured). *fl.* yellow, with a purple spot on the lower lip, large. Summer and autumn. *l.* stalked, ovate, very pointed, and coarsely toothed. Stem hispid. This is considered by some authors to be a variety of *G. Tetrahit*, a common cornfield weed in Britain. (Sy. En. B. 1077.)

GALEOPSIS (of Mœnch). A synonym of **Stachys.**

GALEOTTIA. Included under **Zygopetalum.**

GALE, SWEET. *See* **Myrica Gale.**

GALIACEÆ. A tribe of *Rubiaceæ.*

GALINGALE. A common name of **Cyperus longus** (which *see*).

GALIPEA (native name of one of the species). ORD. *Rutaceæ.* A genus comprising about twenty species of stove evergreen trees or shrubs, natives of South-eastern tropical America. Racemes axillary or terminal, simple or compound. Leaves alternate, petiolate, one to seven-foliolate; leaflets entire, rarely serrated, full of pellucid dots. For culture, *see* **Erythrochiton.**

G. macrophylla (large-leaved). *fl.* pale rose or white, in a stalked interrupted spike or raceme. *l.* unifoliolate, elliptic, glabrous, obtuse, somewhat leathery, 6in. to 12in. long. *h.* 2ft. Brazil. (B. M. 4943.)

G. odoratissima (very sweet-scented). *fl.* white, very fragrant, in many-flowered, sub-sessile, short, axillary spikes. May. *l.* deep green, broad, obovate, obtuse, shortly petiolate. *h.* 2ft. Rio Janeiro. (B. R. 1420.)

G. trifoliata (three-leaved). *fl.* greenish, small, corymbose. September. *l.* trifoliate, smooth. *h.* 6ft. Guiana.

GALIUM (*Galion*, the old Greek name used by Dioscorides, from *gala*, milk; the flowers of one of the species having been used to curdle milk). Bedstraw. ORD. *Rubiaceæ.* An extensive genus of annual or perennial herbs, spread over the whole of the temperate regions of the New, as well as of the Old World, especially abundant in Europe and Northern Asia, penetrating also into the tropics, but there chiefly confined to mountainous districts. The species number 150, and are, for the most part, uninteresting weeds; the following, however, may be employed to cover rockwork: *maritinum*, *purpureum*, *rubrum*, and *uliginosum.* Flowers white, yellow, or (in

Galium—*continued.*

exotic species) red, in axillary or terminal trichotomous cymes or panicles, sometimes reduced to small clusters; calyx completely combined with the ovary; corolla rotate, the tube scarcely perceptible, with four spreading lobes. The annuals require to be sown in any ordinary border, in March; the perennials should be divided at the same time. The genus is represented in the British flora by eleven species, the flowers of one of which—the golden-yellow-flowered Lady's Bedstraw, *G. verum*—are used in some districts to curdle milk, hence one of its popular names, Cheese Rennet.

GALLS. Excrescences of various kinds, produced by the deposit of the eggs of insects in the bark or leaves of plants. What is commonly known as the Oak Apple is caused by a Gall Fly (*Andricus terminalis*). When cut longitudinally, the Gall is seen to inclose a great number of granules, each containing a minute larva. The Rose Bedeguar, frequently seen on the Wild Rose, is the work of another Gall Fly (*Rhodites rosæ*). *Cynips aptera*, a hymenopterous wingless fly, causes large roundish Galls on the roots of the Oak, Elm, Beech, and other trees. Illustrations of the insect and the Galls it makes are given in the "Gardeners' Chronicle," n. s., i. 19.

GALPHIMIA (an anagram of *Malpighia*). ORD. *Malpighiaceæ*. This genus comprises about a dozen species of handsome stove evergreen shrubs, inhabitants of tropical and sub-tropical North America and Brazil. Flowers yellow or reddish, in terminal racemes. Leaves opposite, small. Galphimias thrive in a compost of peat and loam. Cuttings, made of the ripened wood, will root in sand, under a bell glass, in heat.

G. glandulosa (glandular). *fl.* yellow; petals oblong. April. *l.* oval-lanceolate, smooth; petioles with two large glands at top. *h.* 3ft. to 4ft. Mexico, 1824.

G. glauca (glaucous).* *fl.* yellow. *l.* ovate, obtuse, smooth, glaucous beneath, and with one tooth on each side at the base; petioles without glands. Mexico, 1830. (B. H. 8, 45.)

G. hirsuta (hairy). *fl.* yellow. September. *l.* ovate, acute, on short footstalks, hairy on both surfaces. *h.* 6ft. Mexico, 1824.

FIG. 74. GALTONIA CANDICANS, showing Habit and detached Single Flower.

GALTONIA (name commemorative of Francis Galton, author of a "Narrative of an Explorer in South Africa"). ORD. *Liliaceæ*. A genus of a couple of species of very beautiful hardy bulbous plants, natives of South Africa. They are admirably adapted for growing in clumps in

Galtonia—*continued.*

borders, or for conservatory decoration. They prefer a rich leaf mould, with a little sandy peat added. Propagated by offsets, or by seeds.

G. candicans (white).* *fl.* pure white, large, fragrant, drooping, funnel-shaped; raceme about 1ft. long, fifteen to twenty-flowered; scape (inclusive of raceme) erect, glaucous, about 4ft. long. Summer. *l.* lorate-lanceolate, sub-erect, 2½ft. long. Bulb large, round. SYN. *Hyacinthus candicans.* See Fig. 74. (B. H. 1882, 32.)

G. princeps (prince). This is closely allied to the foregoing, but less ornamental, with broader and shorter racemes and smaller, greenish flowers, with spreading segments. (Ref. B. 175.)

GAMOCHLAMYS. Included under **Spathantheum.**

GAMOSEPALOUS. When the sepals are joined together.

GARCIANA. A synonym of **Philydrum.**

GARCINIA (named in honour of Laurence Garcin, M.D., a French botanist and traveller in India, author of numerous botanical memoirs). SYNS. *Cambogia, Mangostana,* and *Oxycarpus.* ORD. *Guttiferæ.* A genus comprising about forty species of stove evergreen fruit-bearing trees. Flowers usually solitary at the tops of the branches. The fruit is very delicious and refreshing. Leaves coriaceous or rarely sub-membranaceous. Garcinias thrive in a peat and loam compost. Cuttings of ripened shoots will root, if inserted in sand, under a glass, in strong bottom heat. The species here described are, perhaps, the best known to cultivation.

G. Cambogia. Gamboge. *fl.* yellow, terminal, solitary. November. *fr.* about 2in. in diameter, drooping, on peduncles 1in. in length. *l.* elliptic, tapering to both ends, 5in. long. *h.* 40ft. Branches spreading, opposite. East Indies, 1822. (B. F. S. 85.)

G. cornea (horny). *fl.* pale yellow, scentless, terminal. January and February. Berry nearly round, the size of a medlar, covered with a dark purple juiceless bark. *l.* opposite, oblong. *h.* 20ft. East Indies, 1823.

G. Cowa (Cowa). *fl.* yellow, terminal. February. *fr.* edible, though not the most palatable. *l.* broad-lanceolate. *h.* 60ft. Chittagong, 1822. A middle-sized handsome tree, yielding an inferior kind of gamboge.

G. Mangostana.* Mangosteen. *fl.* red, resembling a single rose, composed of four roundish petals, which are thick at the base, but thinner towards the margins, terminal, solitary. *fr.* round, about the size of a medium orange; it is esteemed one of the most delicious fruits in the world. *l.* elliptic-oblong, acuminated, 7in. or 8in. long. *h.* 20ft. Molucca Islands, 1789. (B. M. 4847.)

G. Morella (Morella). *fl.* yellowish; panicles terminal and lateral. *fr.* small, edible, in shape and size resembling the Morello Cherry (whence the specific name). *l.* oblong-elliptic, tapering to both ends. *h.* 30ft. to 50ft. Ceylon, Siam, East Indies, &c. This plant yields the Ceylon gamboge of commerce. (B. F. S. 87.)

GARDEN. A Garden is usually understood to mean a piece of land of any description or size, attached to, or connected with, a residence, and set apart, either for the purpose of growing vegetables and fruits for the supply of the household, or for the cultivation of plants and flowers for the embellishment of any part of the house or the Garden itself. The results attending the culture of vegetables and fruits are of the greatest national importance, as representing a necessary source for supplying wholesome food, which it would be impossible to obtain unless care were bestowed in preparing the land and cultivating the crops annually, according as each may require. Flowers, and the plants specially grown for producing them, have a universal charm, presenting a means of endless study and enjoyment to all who properly appreciate their worth. The value of making a Garden of some description wherever practicable in conjunction with every dwelling house, cannot be overestimated, as it invariably tends to promote health and enjoyment. There is an extremely wide range in its application, admitting unlimited arrangements according to the amount of available space to be inclosed or the requirements and taste of those persons who have to incur the expense of preparing or keeping it up. In large towns, the value of land precludes the possibility of obtaining any more than a limited portion as Garden ground, yet this should be utilised to the fullest extent

Garden—*continued.*

for the purposes to which it is best adapted. The amount of interest and pleasure, apart from profit, to be derived from a Garden, depends greatly on the capacity of the individual who may frequently or occasionally visit it, to notice and appreciate the beauties of nature that may be found in every conceivable form around. These advantages of pleasure, combined with utility in obtaining the crops annually, represent the practical outcome of capital expended on Gardens, and an adequate return should be obtained in an indirect, if not in a pecuniary, manner. Very much depends on the gardener using every available means to render his charge attractive and satisfactory to all concerned, as, without this attention, a Garden becomes the reverse of what it really should be. Much more may be accomplished in a small space, if proper and continued attention is bestowed, than would, at first sight, appear credible. This is frequently exemplified in the case of amateurs, who only have window space or that allowed with a small villa or cottage. The love of a Garden and its products, in every way, is one of the prevailing characteristics of English fashion, from the highest to the lowest class of individuals, and it should receive encouragement on every hand. The more a student of nature learns of the various forms and means adopted therein for reaching certain ends, every one of which has some definite purpose, the more is he induced to pursue his investigations, although the gaining of further knowledge only reveals the marvellous extent of the system open for study to those who choose to proceed with it. The form and extent of Gardens depending so entirely on that of the house or mansion with which they are associated, renders it impossible to give more than general advice regarding their position or method of laying out to the best advantage. Some of the principal points to be adopted, and others which it is well to avoid, will be duly noticed, both in the case of Gardens of considerable extent, and also in those of smaller dimensions.

FRUIT AND KITCHEN GARDEN. In planning and laying out this department, on an extensive scale, the exercise of considerable judgment and forethought will be required. It is work that only falls to the lot of comparatively few gardeners in the first instance, yet a knowledge of its performance is frequently requisite to enable alterations to be made with part at a time, that in due course may, in some respects, convert the whole. The most important points to be observed are situation, soil, form, size, and shelter.

Situation and Soil. A situation has sometimes to be accepted irrespective of the condition or quality of the soil, but each requires an equal notice wherever there is a choice. In selecting a site, it should be, if possible, slightly undulated and face the south, or a little south-east. In dry districts, or where the sub-soil is of a gravelly nature, it would be better if the ground were nearly flat, provided efficient drainage could be secured without having to go very deep at any point. If in connection with a mansion, the best position near to it should be selected for the Kitchen Garden, on account of transferring the produce; yet it should be sufficiently far away to allow work of any description to proceed at the proper time. Many proprietors take a great interest in this department, which generally includes nearly the whole of the forcing operations, grape and other fruit culture under glass, &c. It is advisable that the approach from the mansion should be towards the front or ends of the houses, in preference to the back, which is invariably utilised for tool and other sheds. A southern aspect, or nearly so, being that usually selected for garden structures, and also for the front or principal part of a mansion, it follows that the best position for the Garden is on some point towards the east or west, far enough away to admit of the boundary walls being concealed from view by trees and shrubs, and to allow of the approach being in the direction above indicated. The condition of the soil should be considered in several respects—as to its depth in general, the quality of the top spit, and also the sub-soil. A depth of less than 18in. will be unsuitable, the best being from 2ft. to 3ft. A rather heavy loam in some parts, with that of a lighter or more sandy nature in others, will admit of positions being selected for different crops that require such soils; and, for this reason, both are preferable if to be obtained. The quality of the sub-soil, especially when it is of an irony or close, retentive nature, and so prevents the free passage of air and water, has a great effect on all fruit-trees and on garden crops generally. Fruit-trees seldom succeed on such sub-soils, as, once their roots enter it, canker and other diseases immediately attack the branches and cause them to decay. Much may be accomplished in improving and deepening shallow soils by adding more on the top from an adjoining field or other place; but this causes a great deal of work, and, moreover, does not remove the evils attending a bad sub-soil; consequently, the latter should be avoided, if possible. The amount of drainage to be applied artificially depends a great deal on the porosity of the earth beneath the surface. In many cases, it is only necessary to drain the walks; and if the situation of the garden is undulated, this may be easily effected. Land of a retentive, clayey nature may require draining throughout in districts where the rainfall is heavy, in order to remove the superabundant moisture that would otherwise collect. In other soils, resting mostly on gravel, sufficient is generally conducted naturally by the latter from the majority of growing crops. In selecting a situation for the Kitchen Garden, the available means for supplying water must also be considered, as a large quantity is always required in summer. If it can be procured from a stream or large open reservoir exposed to sun and air, it will be found warmer, softer, and better suited in every way for plants, than if obtained direct from a well or spring. A stream passes through some Gardens, and although the water is very useful at times, its presence in spring attracts the least frost, which often proves destructive to fruit blossom and other early crops. If a natural source, higher than the garden itself, is not available, another method may be employed, such as a hydraulic ram, for forcing water into a reservoir at a point sufficiently high to insure its return through pipes to any part of the Garden desired. The above conditions are not always to be obtained, but they should be fully considered wherever there is a choice of site.

Form and Size. Where, as in this case, the cultivation of fruit and vegetables is of first importance, the shape of the ground does not matter materially. This and the size are points depending a good deal on each other, and on the requirements of each place individually. An extensive Kitchen Garden, of some five or six acres of land, has often to be managed for cultivating sufficient fruit and vegetables to supply the demands of a large household. As the expense of laying out a Garden of this size, and the subsequent annual expenditure to keep it stocked, and in good order, are necessarily heavy, the greatest care should be taken, in the first instance, to utilise every means for rendering the whole a permanent success. The size, number of walls, glass structures, &c., must, therefore, entirely depend on requirements and the amount of expense to be incurred. The Kitchen Garden, or a large portion of it, is usually surrounded with walls. These are essential for the cultivation of fruit-trees that would not succeed and ripen crops in the open ground, and they are best placed so as to form either a square or an oblong, with its ends running towards east and west. Such shapes

Garden—*continued.*

admit of the division and arrangement of the inclosure being carried out in a uniform manner, the latter allowing a much larger surface of wall exposed to a southern aspect than the former—an important consideration in many localities, as the borders share the same advantage. Whether the walls should be direct north and south, or facing a little to one side, is a matter on which opinions differ. If set on an angle from the south, they should certainly face a little in an easterly direction, to obtain the full benefit of the sun's rays before midday. Fruit-trees, suitable for all aspects, may be selected so as to cover both sides if desired. Thus, the walls having a southern aspect, should accommodate Peaches, Nectarines, Apricots, and some of the best Pears; the eastern would do for Plums and good hardier Pears that are too tender for succeeding in the open; the western for more Plums and Cherries, also for Apricots in some localities; and the northern for Morello Cherries, late Gooseberries and Currants. In northerly or extreme cold districts, some of the first-named of these trees require a glass covering as well. The proper levels for every main point will be one of the first conditions to be fixed in laying out, and this, on a large scale, will necessitate the use of instruments that are seldom kept by gardeners. Such main points should be decided so as to insure a means of drainage and other necessaries before any of the positions for the walls are fixed, and they should be disposed so that the intermediate spaces may be regulated from them, and the whole work proceed on a definite system thus arranged at the outset. Generally, three or four main walks, intersected with others at right angles, are sufficient for any walled-in Kitchen Garden, the quarters thus formed being sub-divided, for convenience, with paths cut in the ground. The fruit-tree borders should be at least 10ft. or 12ft. wide, and the outer main walk should follow their limit at that distance from the wall. Trained fruit-trees are usually placed parallel with the main walks, sufficiently far back to form the boundary for other borders that should preferably be utilised for growing Roses and hardy flowers for cutting, or for some crop such as a salad. In many Gardens, a range of forcing houses throughout a good portion of the length is thought desirable, and they usually present a fine appearance if built on a plan and of a size proportionate with the surroundings. In most instances, it is, however, advisable to place the glass structures by themselves, just sufficiently far apart to admit of all equally sharing a full amount of sunshine and light. This allows of all being more conveniently connected with a heating apparatus without having recourse to an unnecessary number of boilers. Additional space will usually be required for fruit culture beyond that inside the Garden walls, and an adjoining site should be selected, if suitable, and included within the boundary fence. The soil, subsoil, draining, &c., will need similar attention to be bestowed as in the interior or any other part of the Garden where such trees are planted. Where a good orchard is at command for the supply of Apples, &c., a material advantage is gained in the Garden, by an extra amount of land being available for vegetable culture. It is always best to allow crops plenty of room to develop themselves, as the soil in the intermediate spaces may be more easily cleaned, and the produce will invariably be of a superior quality.

Shelter. An important requisite in connection with the site selected for a Kitchen or Fruit Garden, is shelter. The most destructive winds are those from the East and North-east to North-west. If natural shelter from these quarters can be procured at the outset, so much the better; but otherwise, a screen must be prepared in some way, to neutralise the force of the wind, and to render its effect on tender vegetation less dangerous. This is most effectually provided by planting a double avenue of trees, or forming a wide plantation, so as to include

Garden—*continued.*

trees or shrubs that are of a quick-growing nature, and are known to succeed in the locality. Scotch Firs, *Pinus austriaca, P. Laricio*, and several others of this family, Poplars, Larches, Elms, &c., may be freely used where they are known to succeed. Garden walls, 10ft. or 12ft. high, afford some shelter to the part inclosed; but the evil effects of cold, cutting winds have always to be guarded against, not only for the sake of outside plants, but also for those in forcing or other warm structures. South-west winds are frequently very rough and destructive. It is also advisable to provide a shelter from these, but it should be further away, so as to avoid excluding sun and light. High trees of any description are not desirable near the southern exposure. Those recommended for planting on the northern and eastern sides may commence at a distance of about thirty yards from the Garden boundary.

FLOWER GARDEN AND PLEASURE GROUND. By these terms reference is made to departments entirely devoted to the cultivation of flowers, shrubs, and trees of an ornamental character, selected and arranged with the natural scenery, &c., around, to form a place of resort for interest and pleasure at all times. A Flower Garden is considered an indispensable adjunct to every residence; combined with Pleasure Grounds, it has a more extensive significance as applying to that adjoining or surrounding a mansion. It must, of necessity, be within easy access, so that the most attractive parts may be seen from the windows, or reached in a short time from the outside. The embellishment of Flower Garden beds, and the continued attention required to keep all in good order throughout the year, most seriously affect the other departments where the numberless plants have to be prepared, especially if carpet-bedding is introduced. Where the means at command for storing and growing these plants are totally inadequate for supplying enough to properly fill the space, it would be better to reduce the number of beds, or to devote some of them to select hardy perennials, than to attempt too much with an insufficiency of material, and so destroy the effect of the whole. This is a matter requiring attention when first planning and laying out a Flower Garden. The extent of Pleasure Grounds may be as much as desired, or according as the woods surrounding the mansion will admit. They are frequently made to form a connection between this latter and some other building or permanent place of interest, such as the Kitchen Garden. Apart from the natural scenery and the free use of ornamental trees and shrubs, the introduction of many hardy flowering plants may be recommended, as suitable positions for their development may, perhaps, be better found here than in the Flower Garden proper. The various tastes possessed by proprietors or their friends, with the size of the establishment and the extent to which gardening may be carried, will each have an effect on individual cases, and prevent the following remarks from being more than those of a general character. It is well, if possible, to avoid extremes in the matter of taste, as there is plenty of room for all styles, if restricted to places in which they are appropriate.

Site and Extent. Most of the mansions built some two or three centuries ago are situated in a valley or the lower part of an extensive park. A somewhat elevated position is now invariably chosen, as the great importance of fresh air has become more fully recognised. Extended views of landscape are usually selected for the front or principal outlook; and as these already exist, and, perhaps, form part of the design in fixing the site for the building, neither of them should be selected for the Flower Garden, if another place in the vicinity can be obtained without interfering with that which exhibits natural beauty in itself. An open expanse

Garden—*continued.*

of lawn, with a few clumps of shrubs and trees of limited growth, judiciously placed, would be more appropriate in close proximity to the building from which the view is desired, and would not be likely to detract attention, as would a mass of flowers, from the main object of view beyond. Where such landscape effects do not exist, one of the best positions may be chosen for the Flower Garden—supposing there is sufficient shelter, as the advantage of being able to view it from the windows in any weather, must not be overlooked. Some of the best-arranged and most compact Flower Gardens are those laid out on grass, in an inclosure of which a large conservatory forms part of the boundary, the other part being composed of trees of an ornamental character that afford good shelter, and do not exclude too much light. Shelter is most important in the selection of a site, as the tender exotics used in summer, especially in carpet and sub-tropical beds, will not succeed if too much exposed. Bedding plants present but a poor appearance when allowed to suffer from drought in summer; hence the necessity of an abundance of water. This may, in many instances, be obtained from that supplying the mansion, by means of pipes laid underground, and furnished with screw sockets, wherever desired, for connecting a standpipe and hose. Carrying water by hand is an almost hopeless task in a large establishment in summer.

Preparation of Ground, Flower Beds, &c. Soil which is heavy and retentive is unsuited for a Flower Garden; but at times there is no choice, and the best modes of ameliorating and warming it must be adopted. The first necessary means for attaining this end is thorough drainage, not only for the good of the shrubs and flowers, but also for the whole of the land and walks. The state of the latter has much to do with the general appearance of the Garden, and, if undrained, it is impossible to pass over them with pleasure during or immediately after rain. A gravelly sub-soil will usually drain the lawn and open land sufficiently without pipes, especially if the position is a little elevated; but where the whole is of a clayey nature, and of a good depth, it may be necessary to lay them at distances not exceeding 12ft. apart. The work of laying main drains, and the branches connected therewith, should be a preliminary operation, performed as soon as the various points and levels are fixed, and before the plan of the beds is finally laid out. All tender bedding plants require a rather light, moderately rich soil, to encourage them to root and grow freely so soon as they are planted. If that secured naturally to form new beds be heavy or retentive, it should be dug out about 1½ft. deep, and either partially or entirely replaced with some of a lighter description. Leaf soil is the best of all manures to use, as it tends to encourage rapid root action, without, as a rule, causing an undue growth at the top. In soils already light, an addition of something heavier in the way of loam would be advisable, otherwise leaf mould may be used in quantity. It should be thoroughly incorporated by digging, or part of the plants will outgrow the others. A flower bed prepared for planting should be firm and raked rather fine, and should present a uniform nearly flat surface, about 1in. higher than the edge of the bed, from which it should be clearly separated.

Style and Mode of Laying Out. Various styles of laying out are employed: they may be practically included under two headings—the geometrical, and the free or symmetrical. The former is essentially formal and is largely employed, as being most suitable, for inclosed Gardens surrounded with everything more or less of a formal character. It admits of colours being arranged so that the proportion is evenly balanced when viewed as a whole; one-half of any correct geometrical design being intended as an exact counterpart of the other. The free, or symmetrical, style allows, according as individual taste may suggest, a much wider scope in the shape and arrangement of the beds and their mode of embellishment. This plan, properly executed, is preferred by many, as it dispenses, in great part, with the formality of the other; yet, to be attractive, symmetry must, to a certain extent, be assured both with the beds and their occupants. The surrounding scenery must also be appropriate, and should form the main guide in disposing of the space at command. Although it is scarcely possible to have an excess of flowers, when placed in their proper positions throughout an extended area, yet too much is frequently attempted in Gardens of limited proportions, with the disadvantage that the plants employed are unable to exhibit their true characters. Simple figures, as beds cut out in the turf, in a size proportionate to the surroundings, are invariably most satisfactory, in Gardens of either large or small pretensions, where the

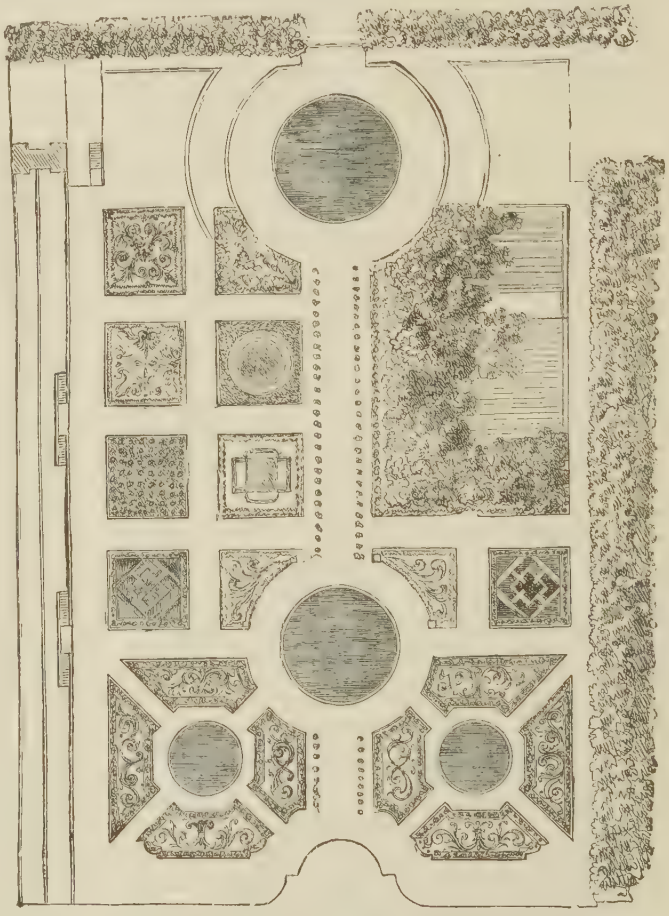


FIG. 75. GROUND-PLAN OF THE TUILERIES GARDEN (TIME OF LOUIS XIII.).

Garden—*continued.*

symmetrical style is adopted. Geometrical designs may also be cut in grass, although some prefer Box or other edgings. Figure gardening was for a long time greatly in vogue; the various scrolls were represented by different shrubs and coloured gravels, the numerous narrow walks between being also gravelled. The ground-plan of the Garden of the Tuileries in the time of Louis XIII. (see Fig. 75) may be interesting as indicating the extent to which the system was carried out in France. Its existence in this country is now almost entirely limited to Gardens of historic interest, the general use of turf having become more prevalent, with the result that a great improvement has been effected in the majority of instances, as the plants and flowers were previously subordinate to the edgings and walks surrounding them.

The method of laying out will be the next proceeding, after the points already noticed are decided, and the preliminary work of draining, levelling, &c., is accomplished. The design on paper, if to be accurately represented on the ground, should be prepared to a scale that may be easily divided, and the enlargement calculated. A Garden, in the shape of a square or parallelogram, of any size, may be more readily laid out than one with an irregular outline. The necessary tools will be a tape measure and measuring rod, a strong line, and some pegs. A right-angled triangle, a pair of wooden compasses, and a large T-square, are also useful instruments. A system of exactly gauging and marking everything, must be adopted where there are many figures to be shown in relation to each other. The outside boundary should be measured out into equal distances of one or more feet, according as it may be practicable to divide the plan; and if these points are marked with pegs, and the positions of all the walks similarly fixed, a foundation will be formed that will facilitate the means of obtaining the other references required. Where there are several walks, it would be advisable to mark all the corners, and insert a few pegs to define their boundaries on both sides. If it is necessary that a main walk should proceed at considerable length, quite straight, an ordinary line is not a certain guide. Upright stakes, about 6ft. high, specially prepared and painted white, with a broad band of black or red near the top, are most useful. When the two ends are fixed by having a stick driven in at each, the intervening space may be accurately marked by others from the sight obtained from either end. If a long curve or sweep is to be laid out, the ends must first be known, and, if possible, a few points between. This may also be marked by similar stakes; but one side is usually obtained by laying a rather heavy line with the hand, and afterwards measuring the width from it for the other. Gardens vary so much in size, shape, and other respects, that it would be impossible to give advice applicable to all alike. The foregoing remarks refer to some of the principles adopted in laying out the Flower Garden or walks in the Pleasure Ground, but other methods may be necessary in instances where these cannot be applied. The Pleasure Ground, as a rule, has only one main walk, sometimes formed of gravel, and at others of a broad expanse of turf. The principal recommendation for gravel is that, if properly laid, it may be walked on in weather and seasons when turf would not be dry enough. In forming Pleasure Grounds, much may be done with trees and shrubs that not unfrequently exist beforehand, by arranging and grouping others, so as to more fully exhibit the true character of those growing in a natural state. Avenues, glades, and vistas, with an irregular outline running into the surrounding woods, terminating with some specimen tree or other object in the distance, and clumps of massive Rhododendrons, placed far enough from the walk to show their beauty when in flower: these should be some of the leading characteristics. The planting of conifers and other ornamental trees should be restricted

Garden—*continued.*

to such as are known to succeed in the locality, as climate and soil greatly affect them everywhere. The permanent positions for these should be selected, so that plenty of room is allowed them to develop, and nothing of interest eventually hidden in consequence. A group of conifers, planted wide enough apart to avoid overcrowding, and surrounded by an open lawn, always has a more striking appearance than when the same number are placed about singly over an extended area.

American Garden. This title signifies an open space in the Pleasure Ground, or some other part of the Flower Garden, wherein a collection of chiefly American plants, or those whose progenitors came from that country, are grown. Many of the most beautiful of hardy flowering shrubs are included amongst these, and others, of a hard-wooded nature, that are usually cultivated and thrive under similar conditions. The Rhododendron and hardy Azalea are shrubs largely grown, and both are now represented in endless and beautiful varieties. Heaths in variety, Ledums, Kalmias, Gaultherias, and many others of a like character, all help to constitute a collection of interesting shrubby plants that cannot fail to be admired. They require a light peaty soil, and will not succeed if chalk is present, or if the drainage be defective. For plants of this description, the usual and necessary plan, where the natural soil is heavy, is to specially prepare beds with peat and leaf soil, which, on the other hand, need not be of a great depth where the sub-soil is light and porous, as none of them are of a deep-rooting nature.

Sub-tropical Garden. Where means are at command, sub-tropical gardening should be adopted in summer so far as the number of plants and suitable situations admit. It is imperative that the latter should be well sheltered from rough winds, as these soon destroy the fine foliage of the plants used. If a suitable site can be obtained in the Flower Garden, it is preferable, as forming a contrast to the ordinary flowering subjects used in the other beds. Large plants, such as some of the hardier palms, tree ferns, Musas, &c., in pots or tubs, present a fine appearance when plunged outside; but these require considerably more room to keep them in winter than can be allowed in any except very extensive places. Many other plants are, however, available that may be raised from seed or cuttings each spring, and these form, in suitable situations, a commendable addition. They require a deep rich soil and more light than palms, &c., which make but little growth outside. Sub-tropical plants, such as *Acacia lophantha*, Cannas, *Eucalyptus globulus*, *Grevillea robusta*, *Melianthus major*, Ricinus in variety, Solanums and Wigandias, with many others, are all of easy culture, and are very effective on account of their varied and attractive foliage.

Hardy Perennial Garden. After a long season of comparative neglect, the large and very important class of herbaceous and other hardy perennial plants once cultivated are again assuming their proper position in many Gardens, by having an extensive border or other space specially devoted to their accommodation. An open situation and a rich soil are preferred by the majority. Shelter, afforded by trees or by other means, is advisable, supposing the former are not near enough to overhang and cause shade, or for their roots to impoverish the ground. Many of the choicest alpine plants require partial shade and thorough drainage. These succeed best in positions such as the nooks and corners of rockwork; consequently, the latter is a useful and oftentimes requisite addition. Herbaceous plants are not unfrequently disliked on account of the appearance nearly always presented by some of the tops dying away. There are, however, always others to form a succession and prolong the flowering season; and it must be remembered that the decaying tops should only be partially removed, as they form the natural protection for the roots in winter. Sufficient interest should be developed

Garden—*continued.*

in hardy plants for the general beauty and floral display presented by such a large proportion of their number, to completely ignore an objection like this. The Perennial Garden or mixed border should be of considerable width, to admit of tall-growing subjects being included; and if a background can be obtained of high Rhododendrons or other evergreens that shelter without causing too much shade, the cultivated plants will be benefited, and, when in flower, will be seen to the best advantage. In Fig. 76 is represented a summer view of an existing garden, a little less than an acre in extent, devoted chiefly to the cultivation of hardy perennial and alpine plants. Sufficient space is here found

FIG. 76. HARDY PERENNIAL AND ALPINE GARDEN.

for upwards of 2000 species and varieties, and all succeed more or less under unfavourable atmospheric conditions.

Rock Garden. Where numerous hardy alpine and herbaceous plants are cultivated, a Rock Garden, greater or less in extent, is the most suitable place for their accommodation. Many of the best and rarest species will not succeed so well elsewhere as they do amongst the crevices on an elevated piece of rockwork, which, in addition, affords a situation for an endless variety of hardy and half-hardy plants. There are few Gardens in which something of the sort might not be constructed and rendered attractive, especially in localities where stones are plentiful. After being once planted, the requisite care in after treatment is but nominal,

Garden—*continued.*

compared with the additional interest thereby secured, particularly when only a select class of plants is allowed, and these are appropriately placed, according to their height or special cultural requirements. Attempts are sometimes made, in a Rock Garden of an extensive description, to imitate, so far as practicable, the work of Nature in the arrangement of the stones employed. This has often to be conducted partially at the expense of providing adequate means for the well-being of the plants, which should be the main consideration. Where space and material are unlimited, excellent results may be attained; but in a confined area, the effect produced in many cases only shows the insignificance of the work in comparison with that of Nature. Rockwork may be introduced for various reasons, apart from the culture of alpines, such as hiding an unsightly wall or other objects of limited height, or for giving a diversity to an otherwise flat and uninteresting scene. A Rock Garden may be successfully formed where the surface is generally flat, by digging a deep cutting of an irregular outline through a piece of ground, and utilising the soil thus obtained as mounds of uneven heights along the upper part on either side, whereon trees and evergreen shrubs may be planted as a background and for affording shelter. The stones should be arranged to form cavities of an irregular size and shape, for the accommodation of various plants, from the sides of a walk made in the centre of the cutting, up the gradual slope formed by the soil, until the shrubs in the background are reached. It does not so much matter what the quality of the soil is underneath, providing it is porous enough to insure drainage, as additional new soil should be given each plant when inserting it. Formality must be avoided as much as possible in the arrangement, and the stones should be deeply embedded, in order to hold them firmly. Various aspects are desirable to suit different plants, and these should be readily secured in a Rock Garden by the irregular shape the latter should assume in construction. Artificial masses of rockwork, for ornamental effect, are sometimes introduced into the slopes of hills adjoining a mansion; and, if properly executed, they present quite a natural and fine appearance. The extent of, and position for, a Rock Garden must depend on the surroundings, and on the amount of space and number of plants at command. If arranged on a mound in the open, the slope should be very gradual; and a good proportion of shrubs should be introduced near the top. Dwarf-growing shrubs, Yuccas, and other subjects of an evergreen character, are always acceptable for their attractiveness in winter when the primary alpine and herbaceous occupants are resting. Care should be taken not to over-fill the cavities with soil, so as to bury the stones; and the surface of each, when planting, should be left somewhat flat, in order that rain and other water may enter the ground instead of running off. Considerable experience is necessary for the proper construction of a Rock Garden on a large scale, and a knowledge of the various habits of hardy plants is requisite before their positions for planting can be appropriately fixed. A quantity of loam and leaf soil, with some small pieces of granite or other stone, should be mixed beforehand, and a portion placed round each plant, the addition of peat being made in the case of those requiring it. Rockeries usually improve in appearance with age, and when the plants have had time to develop and fill their allotted space. Other plants may be continually introduced, and improvements effected, where the arrangement of those first selected proves in any degree unsatisfactory. Annual top-dressings of new soil should be given to such as do not appear to succeed; and a plentiful supply of water in summer is requisite, almost without exception, for all.

Wild Garden. Of recent years, the naturalisation

Garden—*continued.*

of hardy plants has received more than usual attention by the formation of Wild Gardens, wherein they may grow and produce an effect by an artificial arrangement something like the appearance presented by them in a natural state. The spot selected for a Wild Garden should be possessed of some natural attraction adapted to artificial improvement; otherwise, the attempt to imitate Nature will be but a poor one. Various strong-growing perennials that cannot be afforded space to develop in the mixed border or rockery, form the best of subjects to arrange in the Wild Garden, which, in country districts, cannot be better situated than in a part of the Pleasure Ground more or less surrounded with woods. Many of the beautiful bulbous plants that may be secured in quantity, succeed admirably under trees; and, when flowering above the grass, in spring, in large groups, they present a charming appearance. Narcissi in great variety, common Hyacinths, Primroses, hardy Cyclamens, various Liliums, Snowdrops, and numerous other subjects of a similar nature, are well suited for naturalising in masses. Tall-growing plants, such as Asters, Foxgloves, Polygonums, strong-growing Roses, and others, in endless variety, may be similarly treated where there is sufficient room for their full development. The Wild Garden, as its name indicates, should be specially set apart as a place for the cultivation of hardy plants that grow freely, and where they may be allowed to do so at will with only very limited restriction.

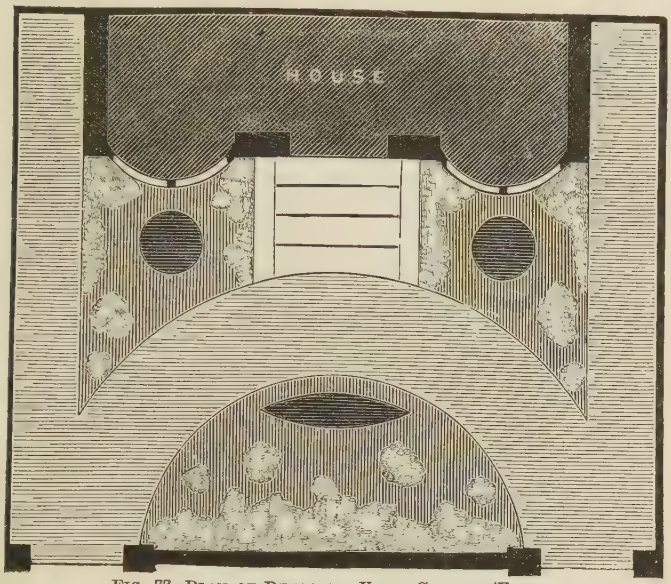


FIG. 77. PLAN OF DETACHED VILLA GARDEN (FRONT CARRIAGE ENTRANCE).

Rose Garden. The popularity of Roses, and their general beauty in summer, demand special attention in the matter of cultivation, which cannot be better secured than by specially selecting a position for the purpose, and arranging the different sections, as dwarf, standard, climbing, or pillar plants, to form a garden exclusively for Roses. A piece of ground should be set apart in every large establishment for this purpose, and if the habits of the various sorts are studied and due notice given in the respective positions selected for them, a floral effect may be obtained, and a greater or less quantity of flowers gathered for four or five months in the year. For further information and culture, *see* **Roses.**

VILLA GARDENS. Villas most largely preponderate in the suburbs of cities and extensive commercial centres or towns, and are built either as detached or semi-detached residences, with an adjoining Garden, that must necessarily be of a limited character. Detached villas are usually situated at or near one end of their own grounds a small space at the front being devoted

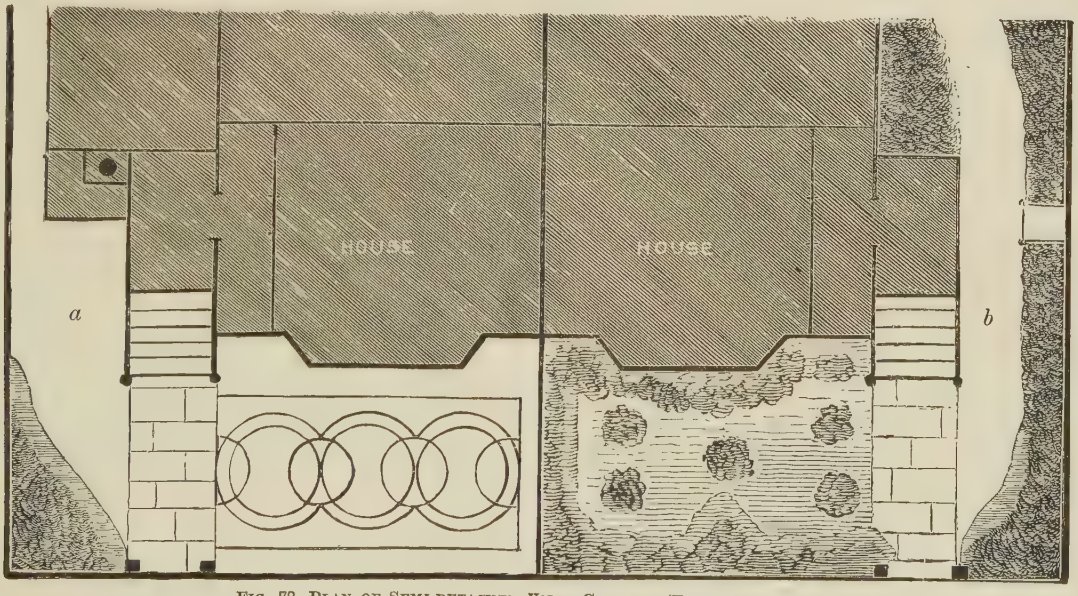


FIG. 78. PLAN OF SEMI-DETACHED VILLA GARDENS (FRONT ENTRANCES).

Garden—*continued.*

to lawn and shrubs, with or without a carriage drive to the door, and the back part also laid out in lawn, with the addition of as many shrubberies and flower beds as may be thought desirable; the space beyond this being utilised for a Kitchen Garden, if there is sufficient inclosed. Semi-detached residences are frequently limited to a piece of land not much exceeding half the size of that allotted to those entirely isolated, and are at a further disadvantage of each being overlooked from the neighbouring side. It frequently happens that these Gardens are laid out by the builder when his operations are finished, and the incoming tenant has, perhaps, only a short lease, which naturally prevents him going to the expense of extensive alterations to suit personal requirements for a very limited time. It cannot be expected that anything elaborate can be obtained in such a limited space as that connected with a villa; yet it is surprising what an amount of interest and pleasure may be derived from such, if care and judgment are exercised—first, in laying out, and afterwards in the selection of suitable subjects for filling the space at command. Flower beds are recommended, so far as circumstances admit, particularly those of a mixed character, where the permanent occupants may be select hardy perennial and alpine plants, various spring flowering bulbs, &c.; and the intervening spaces filled, in summer, with annuals and various tender bedding subjects. A position should always be found for Roses, as they are indispensable in every Garden. The selection of shrubs should be restricted to such as are known to be limited in growth, and suitable for their positions, when required for the lawn or for a border below the front windows. When it is necessary to plant trees near flower beds, for a screen, considerable injury must, of necessity, be caused by the roots permeating the soil, and by the tops frequently overhanging and so causing too much shade. One of the greatest faults in any Garden is overcrowding. This should be a point especially avoided with those adjoining villas, where the owners, in their laudable endeavour to grow as many things as possible, are often advised to try what is quite beyond their means to successfully accomplish. Laying out, replanting, the care of plants, &c., grown in the greenhouse or frames, with the ordinary general attention requisite for all, should always be entrusted to someone competent to advise and undertake it, in preference to employing another whose services may be procured at a cheaper rate. Just sufficient trees, of limited growth, should be planted to insure privacy at all times; a certain portion of the inclosure, according as circumstances admit, being devoted to the cultivation of a few good shrubs and flowers, and the rest laid in turf, *i.e.*, supposing the whole is arranged for pleasure only. This is generally the intention with villa Gardens, in which a space is allowed, perhaps not exceeding 6yds., from the house to the front boundary, and another, about 25yds. long, at the back, the width being that of the building and its side entrance. A greenhouse is always interesting when adjoining a villa, if the plants therein are such as do well, and are properly tended—a condition, perhaps, not practicable with all, but one that is insufficiently studied where means are at command. Far more pleasure is derived from a few floriferous plants well grown, than from a quantity that merely exist, and are unduly crowded. Villa Gardens depend so much on the plan adopted with the building and with others adjoining it, also on the taste and resources of the proprietor or tenant, that definite advice cannot be given so as to be applicable to all. With a view to assist amateurs in the arrangement or laying out of their gardens permanently, both in the front and back parts of their residences, some illustrations are given with a view to suggestions being taken therefrom. In Fig. 77 is represented the front

Garden—*continued.*

entrance to a detached villa by a semi-circular carriage drive. The object is to screen the door from view outside by a thick shrubbery, and to have circular flower beds cut in the turf on each side of the steps; a larger one of another shape, also for flowers, such as dwarf Roses, being situated in the front, on the opposite side of the drive. Front gardens connected with two semi-detached villas are shown in Fig. 78. That on the left (*a*) is laid out in a formal style, a large flower bed surrounded with a gravel walk. The bed might be planted geometrically,

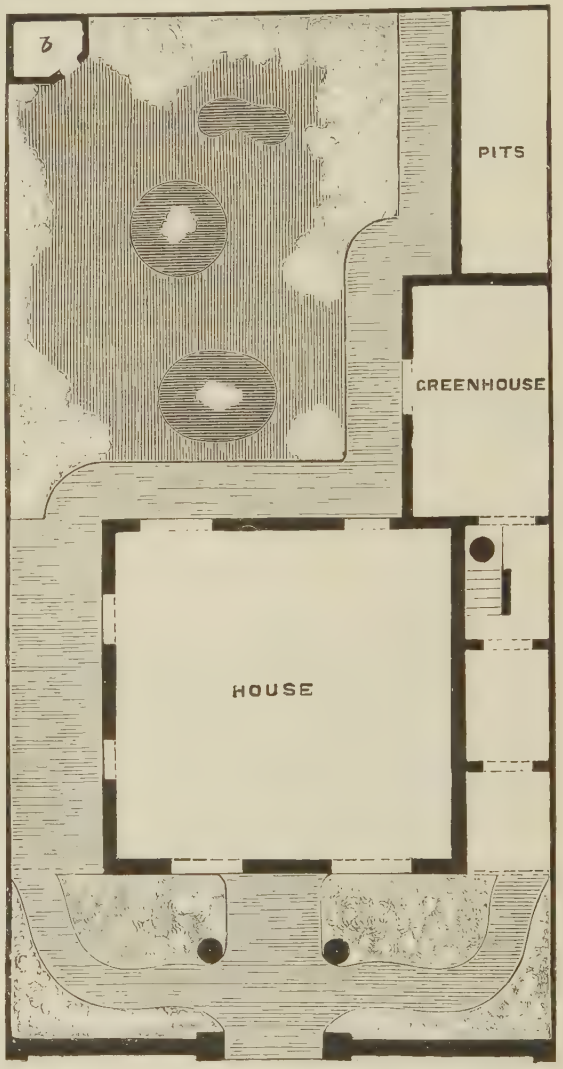


FIG. 79. PLAN OF DETACHED VILLA AND GARDEN.

as shown, or in any way desired. The other (*b*) has a narrow border of shrubs under the window, which is continued round as far as the entrance gate. The space between is intended for turf, with a few small beds cut in it for flowers or some dwarf shrubs. This style is much to be preferred to the preceding one. A plan of a detached residence situated inside its grounds is represented in Fig. 79. This shows a greenhouse and pits attached to the building, the lawn having flower beds in it, and nearly surrounded with a dwarf shrubbery. The object here

Garden—*continued.*

is to get the best view from a summer house in the corner (*b*), and from the windows of the principal rooms. The plan shown at Fig. 80 is one that might be adopted on a rather large and expensive scale for a Garden connected with a good-sized villa. The outside boundary is usually a wall, and in this case it is intended to be hidden by a row of dwarf Robinias and an irregular belt of shrubs. These

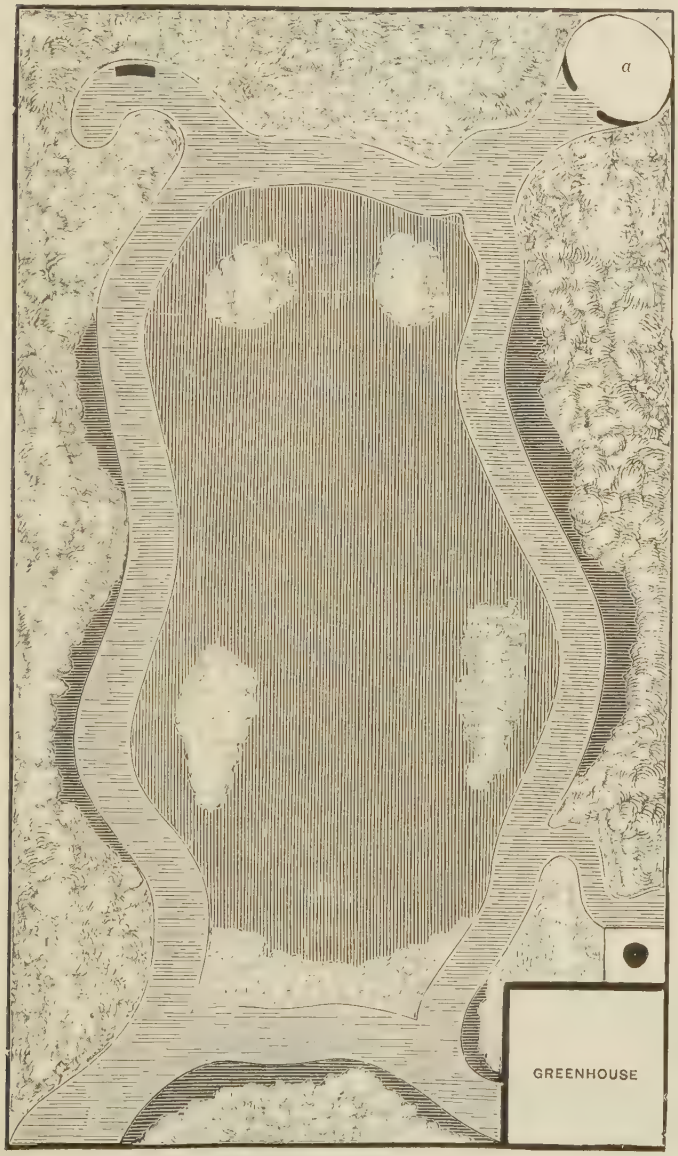


FIG. 80. PLAN FOR VILLA GARDEN.

are followed by turf and a walk of an irregular outline, which ends in a rustic summer house at one corner (*a*) and has a garden seat at another. A greenhouse joins the residence, which is not shown in the figure; and the lawn, situated in the middle, has a few clumps of evergreen flowering shrubs arranged in the corners and curves formed by the walks. Considerable expense would

Garden—*continued.*

be incurred in stocking and properly keeping up a Garden of this description; but it would not require to be frequently renewed, like a quantity of summer flower beds.

GARDEN CRESS. *See* **Cress, Garden.**

GARDENER'S GARTER. *See* **Phalaris arundinacea variegata.**

GARDEN FRAMES. *See* **Frames, Garden.**

GARDENIA (named in honour of Alexander Garden, M.D., of Charlestown, Carolina, one of the correspondents of Ellis and Linnæus). Including *Rothmannia*. ORD. *Rubiaceæ*. A genus comprising about sixty species of elegant stove or greenhouse evergreen trees or shrubs, indigenous to tropical Asia, as well as the Cape of Good Hope. Flowers white, axillary or terminal, usually solitary, and generally sweet-scented; corolla funnel-shaped or salver-shaped, having the tube much longer than the calyx, and the limb twisted in æstivation, but afterwards spreading. Leaves opposite, rarely whorled. The double forms of *G. florida* and *G. radicans* produce white flowers that are amongst the most beautiful and highly perfumed of any in cultivation. Gardenias are principally grown for the use of the flowers in a cut state, as these are in great demand, and appear so much in a succession as not to render the plants sufficiently attractive by their presence for ordinary decoration, excepting that of the stove. Propagation is readily effected by cuttings. Strong, healthy ones should be selected, preferably with a heel attached, such as those obtained from the points of side shoots, half or fully ripened. Early in January is the best time to propagate for allowing the plants a long season to grow before flowering the next winter; but almost any time in the year will do when suitable cuttings can be secured. They should be inserted singly in small pots of sandy peat, unless required in large quantities, when this plan would demand too much space, and the alternative of placing several in a larger size would have to be adopted. The pots should be plunged in a bottom heat of about 75deg., in an inclosed frame of the propagating house, and allowed to remain there until the cuttings are rooted.

Cultivation. Gardenias are not difficult to cultivate, provided they have plenty of heat and moisture during the growing season, and are kept free from insects. These conditions encourage the production of strong healthy shoots, which, after being ripened, and the plants rested, supply a large quantity of flowers from the points. The young plants, when rooted, should be hardened from the frame to the open house, and potted on by liberal shifts as becomes requisite, in a lumpy compost of two-thirds peat to one of fibry loam, with an addition of some charcoal. Where bottom heat is not at command, a hotbed of fermenting material is frequently made up in a house, for plunging the pots in, the house itself being heated by pipes in the ordinary way. If carefully managed, and not allowed to over-heat, this plan is generally attended with good results. Very large plants may be obtained, under proper treatment, in one season; and if a succession is propagated occasionally to follow others, and thus some are in different stages of growth, the supply of flowers may be considerably prolonged. After the season's growth is completed, a lower temperature and more air should

Gardenia—*continued.*

be given. Some persons prefer planting out Gardenias in a heated structure over hot-water pipes; but cultivating in large pots allows the advantage of being able to shift them for destroying insects and for subjecting them to lower temperatures in other houses. It is not advisable to keep old plants; much better flowers, and a greater quantity, may be obtained from young ones grown rapidly by liberal treatment each, or, at least, every second, year. Almost any amount of water may be applied to the roots in summer, and syringing morning and evening may be freely practised.

Insects. Gardenias, if not well looked after, become more infested with insects than is usual with even the ordinary occupants of warm houses. Mealy Bug is most destructive, collecting in quantities about the points, and crippling the young flowers and leaves. Careful watching for these, from the time cuttings are inserted, must be constantly kept up, and measures taken to insure their eradication if found. A wineglassful of petroleum to a three-gallon can or open pail of tepid water, thoroughly mixed, by having a syringe filled two or three times, and its contents returned into the can, previous to being applied, is one of the best insecticides. The plants should be laid on their sides, if in pots, the operation performed in dull weather, and the petroleum thoroughly removed by clean water half an hour later. This may be practised occasionally as a preventative. Green Fly is readily destroyed by fumigation; Red Spider may be kept down considerably by syringing; and if Scale should be troublesome, they must be removed by sponging. All these infest Gardenias at some time, if the least chance is given; consequently, a watch must be kept, and measures applied, as preventatives to their becoming established.

G. amœna (pleasing). *fl.* white, having the lobes purple on the outside in that part which is exposed to the air, while the corolla is in æstivation, almost terminal, solitary, sessile; tube greenish, long, terete. June. *l.* oval, acute, glabrous, on short petioles; spines axillary, short, straight. *h.* 3ft. to 5ft. China. Stove. (B. M. 1904.)

G. florida (flowery).* Cape Jessamine. *fl.* white, sweet-scented, solitary, almost terminal, sessile, salver-shaped, nine-parted. August. *l.* elliptic, acute at both ends. *h.* 2ft. to 6ft. China, 1754. Plant shrubby, unarmed, erect. Stove. (B. M. 3349.) Of this species, there are several varieties, and that usually grown as *florida* is but a double-flowered variety (B. M. 2627).

G. f. Fortunei (Fortune's).* *fl.* white, large, pure, fragrant. July. *l.* opposite, or in whorls, bright shining green. China. Apparently a very large form of the typical species. (B. R. 32, 43.)

G. f. variegata (variegated). This is much the same as the type, but has leaves beautifully margined with yellowish-white. A handsome form.

Gardenia—*continued.*

G. nitida (shining).* *fl.* white, terminal, solitary; calyx six-parted; corolla with a narrow tube and a seven-parted, reflexed limb. October and November. *l.* opposite or tern, oblong-lanceolate, undulated. *h.* 3ft. Sierra Leone, 1844. Stove. (B. M. 4343.)

G. radicans (rooting). *fl.* white, solitary, almost terminal, and nearly sessile, salver-shaped, very fragrant. June. *l.* lanceolate. Stems radicant. *h.* 1ft. to 2ft. Japan, 1804. Plant shrubby, unarmed. Greenhouse. (B. M. 1842.)

G. r. major (larger).* This is one of the most profuse flowering forms; it is larger in all its parts than the type, but smaller than *G. florida.*

G. r. variegata (variegated). *l.* margined with white. Japan. An interesting and elegant form. See Fig. 81.

G. Rothmannia (Rothmann's). *fl.* yellow, purple; sepals subulate, rounded; tube smooth, dilated, short. July. *l.* oblong; stipules subulate. *h.* 10ft. Cape of Good Hope, 1774. Greenhouse. (B. M. 690.)

G. Stanleyana. *See* **Randia maculata.**

FIG. 82. GARDENIA THUNBERGIA, showing Habit and detached Single Flower.

G. Thunbergia (Thunbergia).* *fl.* white, large, fragrant, terminal, solitary, sessile, eight-parted. January to March. *l.* elliptic, acute, glabrous, opposite, or three or four in a whorl. *h.* 4ft. to 5ft. Central and Southern Africa, 1774. Plant shrubby, unarmed. Greenhouse. See Fig. 82. (B. M. 1004.)

GARDEN PINK. *See* **Dianthus plumarius.**

GARDOQUIA (named in honour of Don Diego Gardoqui, a Spanish financier of the eighteenth century, who promoted the publication of a Flora of Peru). SYN. *Rizoa.* ORD. *Labiatæ.* A genus comprising about twenty-six species of greenhouse or half-hardy subshrubby evergreens, natives, for the most part, of Chili and Peru. Calyx tubular, thirteen-nerved; corolla with a long, almost straight tube, its upper lip notched, the lower in three lobes, the middle one of which is broadest. Leaves small, numerous, entire, rarely largely dentate. Gardoquias thrive in a compost of loam, peat, and sand. Propagation is effected by cuttings, made of half-ripened shoots, and inserted in sand, under a bell glass. When rooted, the young plants should be potted off in small pots, and grown near the glass, in a greenhouse, and, as they advance in size, shifted into larger-sized pots.

FIG. 81. SHOOT OF GARDENIA RADICANS VARIEGATA.

G. betonicoides (Betony-like) is **Cedronella mexicana** (which *see*). See Fig. 83. (B. M. 3860.)

G. breviflora (short-flowered). *fl.* secund, in whorls; calyx a little coloured, with lanceolate-acute

Gardoquia—*continued.*

teeth, and with the throat naked inside. *l.* on short petioles, roundish-ovate, obtuse, with scarcely revolute margins; floral leaves similar to the rest. Peru. This species is scarcely distinct from the genus *Micromeria*, in consequence of the corolla hardly exceeding the calyx.

FIG. 83. CEDRONELLA MEXICANA (GARDOQUIA BETONICOIDES), showing Habit and Single Whorl of Flowers.

G. Gilliesii (Gillies'). *fl.*, corolla scarlet, pubescent; calyx elongated, erect, with lanceolate, subulate, nearly equal teeth; throat naked inside. June. *l.* oblong-linear, or cuneated, obtuse, quite entire, narrowed at the base, green on both surfaces, flat; floral leaves similar to the others. Valparaiso, 1820. Plant procumbent. (B. R. 1812.)

G. multiflora (many-flowered). *fl.* in loose whorls, sub-secund; cymes pedunculate, scarcely dichotomous; corolla scarlet or purple, more than 1in. long. April. *l.* petiolate, ovate, bluntish, crenated a little, rounded at the base, green, pale beneath. Stems hard at the base, but scarcely woody. *h.* 1ft. Chili. (B. M. 3772.)

GARIDELLA. Now included under **Nigella** (which *see*).

GARLAND FLOWER. A common name for *Hedychium*. It is also applied to *Daphne Cneorum* and *Pleurandra Cneorum*.

GARLIC (*Allium sativum*). This perennial has been extensively cultivated in Europe, Asia, and North Africa, from remote antiquity. It has become naturalised in Sicily, the South of France, and most of the South of

FIG. 84. GARLIC.

Europe, being found growing in meadows, pastures, and waste places. According to De Candolle, the only country in which it is known to be undoubtedly wild is the Kirghis Desert. Garlic has been cultivated in this country

Garlic—*continued.*

since 1548. At one time, it held a place in most of the early pharmacopœias; but, like many other of our vegetable medicines, has fallen into disuse. In Britain, it is employed as a culinary ingredient; but, on account of its extremely penetrating and diffusive odour, it is seldom served up in a solid state. Garlic is easily propagated by seeds, which should be sown in the open ground, in March; or by dividing the cloves of the bulbs (see Fig. 84) into as many parts as they admit, to form separate plants. A light soil, and rather dry position in the kitchen garden, suit them best, planting the cloves early in March, about 9in. asunder, in drills 1ft. apart, and covering with 2in. of soil. An occasional hoeing, to destroy weeds, will be all that is necessary for the after treatment, until the tops die, when the roots should be lifted and dried in the sun. A few may be planted in autumn for an early supply, only a small quantity being usually required at one time in private gardens.

GARLIC PEAR. *See* **Cratæva.**

GARRYA (named in honour of Michael Garry, of the Hudson's Bay Company). Including *Fadyenia*. TRIBE *Garryaceæ* of ORD. *Cornaceæ*. A genus consisting of about eight species of ornamental hardy ever-

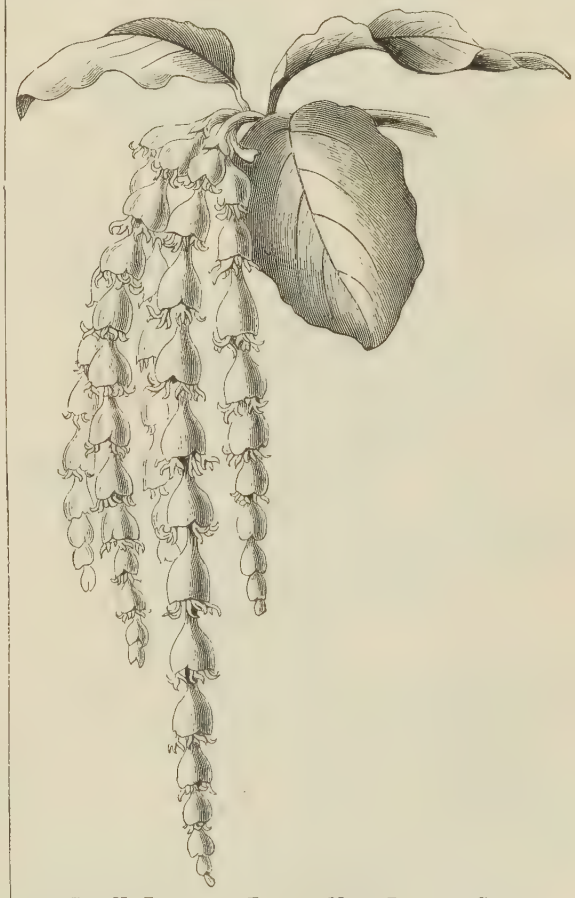


FIG. 85. FLOWERING TWIG OF MALE PLANT OF GARRYA ELLIPTICA.

green shrubs, of which seven are found in California and Mexico, and one in Cuba and Jamaica. Flowers, male and female on different plants, arranged in elegant pendulous catkins, proceeding from near the apex of

Garrya—*continued.*

the shoots, and often from 4in. to 9in. long. Leaves opposite, petiolate, entire or denticulate, penninerved. *G. elliptica* is the only species in general cultivation. It forms an elegant bush plant for the shrubbery border in the South of England, but is, perhaps, seen to the greatest advantage when grown against a wall or trellis. Propagated by seeds; or by cuttings of half-ripened wood, inserted in sandy loam, in August, and shaded from strong light until rooted.

G. elliptica (elliptical).* *fl.* greenish-white or yellowish. Spring. Berries black. *l.* elliptical, dark green and shining above, hoary beneath. *h.* 8ft. to 10ft. California, 1818. See Fig. 85.

G. Fadyenii (M'Fadyen's). *male flowers*, spikes branched, pendulous; sepals cohering at apex. *female flowers*, spikes simple, erect; style short, thick. Spring. *l.* elliptic, shortly apiculate. Jamaica.

G. Fremonti (Fremont's). *fl.* resembling those of *G. elliptica*, but catkins shorter and less decidedly pendulous. *l.* oblong or obovate, acute, slightly wavy at the margins. North-west America. (G. C. 1881, xv. 431.)

G. macrophylla (large-leaved). *fl.* green; racemes short, disposed in terminal, dense, few-flowered panicles. Spring. *l.* ovate-elliptic, 4in. long, 2½in. broad. *h.* 6ft. Mexico, 1846.

FIG. 86. BRANCH OF GARRYA THURETI.

G. Thureti (Thuret's). A garden hybrid, intermediate in general characters between its two parents, *G. Fadyenii* and *G. elliptica*, the first being the seed-bearer. It was raised in the Paris Botanic Garden about 1862. See Fig. 86. (R. H. 1879, 154.)

GARRYACEÆ. A tribe of *Cornaceæ*.

GARUGA (native name). ORD. *Burseraceæ*. A genus of about eight or ten species of ornamental stove evergreen trees, natives of tropical Asia and America, with one from Australia. Flowers yellowish. Leaves imparipinnate; leaflets almost sessile, crenate. The species here described is the one most generally met with in cultivation. For culture, *see* **Boswellia.**

G. pinnata (pinnate). *l.* somewhat villous; leaflets oblong, lanceolate, bluntly crenate. Drupe globose, fleshy, with a rough austere taste. *h.* 60ft. East Indies, 1808. A deciduous tree, with soft, spongy wood.

GASTERIA (from *gaster*, a belly; referring to the swollen base of the flowers). ORD. *Liliaceæ*. A genus of about fifty species of greenhouse evergreen succulents, closely allied to *Aloe*, natives of the Cape of Good Hope. Flowers racemose or panicled; pedicels red; bracts small, persistent; peduncles naked. Leaves usually rosulate, thick, fleshy, generally tongue-shaped or ensiform. Under cultivation in this country, the flowering season of all the Gasterias is during the winter months. For culture, *see* **Aloe.**

G. acinacifolia (scimitar-leaved). *fl.* orange. March to September. *l.* distichous, scimitar-shaped, with cartilaginous prickly edges. 1819. (B. M. 2369, under name of *Aloe acinacifolia.*)

G. brevifolia (short-leaved).* *fl.* red, nearly 1in. long; raceme 1ft. long; peduncles 1ft. long, simple or forked. July. *l.* ten to twelve, close together, lingulate, 3in. to 4in. long; apex bluntly cuspidate; dirty green, with numerous small white spots. Stems leafy. Previous to 1809.

G. carinata (keeled).* *fl.* 1in. long; raceme 1ft. long; peduncles simple, 1½ft. long. *l.* fifteen to twenty, dense, outer ones spreading, inner ones ascending; all lanceolate, 5in. to 6in. long; face concave; back distinctly keeled; apex deltoid-cuspidate. Stem leafy. 1731.

G. Croucheri (Croucher's).* *fl.* numerous, pendulous, 2in. long; perianth tubular, cylindric, contracted in the middle, upper part white, with green veins, lower pale rose-colour; racemes numerous, 8in. to 10in. long, curving upwards; scape 2ft. to 2½ft. high. August. *l.* numerous, spreading, recurved, 1ft. long, 3in. to 3½in. broad at base, ¾in. to 1in. thick, dark green, spotted with white; margins toothed. *h.* 2ft. Origin unknown. (B. M. 5812, under name of *Aloe Croucheri.*)

G. disticha (two-ranked).* *fl.* scarlet, nearly 1in. long; racemes 1ft. or more in length; peduncles the same, simple or branched. *l.* ten to twelve, distichous, dense, patent, 4in. to 6in. long, 1½in. broad; face flat, with small obscure green spots on both surfaces. Stem leafy. 1820. There are several varieties of this species.

G. glabra (glabrous). *fl.* 1in. long; racemes 1ft. or more long, forty to fifty-flowered; peduncle simple, 6in. long. *l.* fifteen to eighteen, dense, outer ones recurved, inner ones erecto-patent, lanceolate, 6in. to 9in. long; face concave, shining green, both surfaces with small white spots; apex deltoid-cuspidate. Stem leafy. 1796. (B. M. 1331, under name of *Aloe carinata.*)

G. maculata (spotted).* *fl.* scarlet, ¾in. long; raceme 1ft. long; peduncles 1ft. or more long, simple or branched. *l.* sixteen to twenty, distichous, loosely disposed, erecto-patent, bright shining green or purple, 4in. to 6in. long, with large white bright spots in profusion; base dilated, rose-colour. Stem leafy, 6in. to 9in. 1759. (B. M. 979, under name of *Aloe Lingua.*)

G. nigricans (blackish). *fl.* nearly 1in. long; raceme 1ft. to 1½ft. long; peduncle stout, 1ft. or more long, always simple. *l.* twelve to twenty, distichous, dense, tongue-shaped, coriaceous, 4in. to 8in. long; face swollen below, flat above, shining, dark or purple-green, with copious small white spots. Stem leafy, 2in. to 3in. 1790. (B. M. 838, under name of *Aloe Lingua crassifolia.*)

G. nitida (shining). *fl.* 1in. long; raceme 1ft. to 1½ft. long; peduncle 1ft. or more long, simple. *l.* twelve to fifteen, dense, outer ones spreading, inner ones spreading, all lanceolate, 8in. to 9in. long, bright green; face concave; back oblique, keeled, with copious small white spots on both surfaces. Stem leafy, 1½in. to 2in. 1790. (B. M. 2304, under name of *Aloe nitida.*) The variety *grandipunctata* has larger spots.

G. pulchra (fair).* *fl.* scarlet, ¾in. long; raceme 1ft. long; peduncles 1ft. or more long, branched. *l.* sixteen to twenty, distichous, loosely disposed, all ascending, sometimes 1ft. long; face concave, with large bright green or purplish spots on each surface. Stem leafy, 6in. or more high. 1759. (B. M. 765, under name of *Aloe maculata.*)

G. variolosa (variegated). *fl.*, inflorescence and perianth agreeing with *G. maculata*. *l.* fifteen to eighteen, in a congested, sessile, spirally distichous rosette, ligulate-lanceolate; the edge white and horny in the upper half, slightly eroded; the surfaces smooth, dull green, densely spotted with copious, immersed, small oblong whitish-green blotches. *h.* 1ft. 1860. (Ref. B. 347.)

G. verrucosa (warty).* *fl.* 1in. long; racemes four to eight, disposed in a deltoid panicle, terminal, 6in. long; peduncles 6in. long. *l.* ten to twelve, distichous, close, ensiform, outer ones patent, inner ones alone ascending, 6in. to 9in. long; face concave; apex sub-pungent; back swollen. Stem leafy, 1in. to 2in. 1731. (B. M. 837, under name of *Aloe verrucosa.*)

GASTONIA (named in honour of Gaston de Bourbon, 1608 to 1660, natural son of Henri IV. of France). ORD. *Araliaceæ*. A stove evergreen shrub, allied to **Aralia** (which *see* for culture).

G. cutispongia (spongy-barked). Bois d'Éponge. *fl.*, panicles 1ft. long; umbels at end of crowded erecto-patent branches; petals, stamens, styles, and cells of ovary, each ten to twelve.

Gastonia—*continued.*

l. at the tops of the branches, impari-pinnate; leaflets six to eight, coriaceous, ovate, obtuse, quite entire. Mauritius. A tall, smooth tree, covered with spongy bark. This plant is now referred to the genus *Polyscias.*

GASTRODIA (from *gaster*, a belly; referring to the swelling of the column in front). ORD. *Orchideæ.* A genus of about seven species of tall, slender, leafless, whitish or brown terrestrial orchids, found in Australia, New Zealand, and the Indian Islands. For culture, *see* **Pogonia.**

G. Cunninghamii (Cunningham's). *fl.* dirty green, spotted with white; bracts short, scarious; claw of lip winged; blade linear-oblong, membranous, waved, with two thick ridges down the middle; column very short. Stem 1ft. to 2ft. high; root sometimes 18in. long, very stout. SYN. *G. sesamoides.*

G. sesamoides (Sesamum-like). A synonym of *G. Cunninghamii.*

GASTROLOBIUM (from *gaster*, the belly, and *lobos*, a pod; in reference to the pods being inflated). ORD. *Leguminosæ.* A genus, containing thirty-two species of greenhouse evergreens, limited to Western Australia. It is closely allied, on the one hand, to the strophiolate species of *Oxylobium*, only differing from them in the number of ovules, constantly two; and, on the other, to *Pultenæa*, from which it is distinguished by the habit, the coriaceous leaves, the bracteoles either deciduous or inconspicuous, and the more coriaceous turgid pod. Flowers yellow, or the keel and base of the standard purple-red, in terminal or axillary racemes, either loose or contracted into corymbs or whorl-like clusters; bracts and bracteoles usually very deciduous. Leaves on very short petioles, more or less distinctly verticillate or opposite, simple and entire, usually rigid; stipules setaceous, rarely wanting. For culture, *see* **Pultenæa.**

G. bilobum (two-lobed).* *fl.* numerous, in very short, almost umbel-like terminal racemes. March to May. *l.* mostly verticillate, in threes or fours, from obovate to narrow-oblong, thinly coriaceous, glabrous and veined above, pale and often minutely silky pubescent underneath. 1839. A tall shrub. (B. M. 2212; B. R. 411; L. B. C. 70.)

G. calycinum (large-calyxed).* *fl.*, racemes terminal or in the upper axils; bracts larger and more membranous than in any other species. *l.* opposite or in threes, oblong-elliptical, or more frequently from ovate-lanceolate to lanceolate, with a pungent point, coriaceous, rigid, reticulate, and often glaucous. An erect shrub.

G. emarginatum (emarginate). A synonym of *G. velutinum.*

G. trilobum (three-lobed). *fl.* few, in loose axillary racemes, not usually exceeding the leaves. *l.* rhomboidal or three-lobed, sometimes lanceolate, sometimes very broad and short, very coriaceous, often glaucous, the fine reticulations scarcely prominent. A much-branched, quite glabrous species.

G. velutinum (velvety). *fl.* orange-red, in terminal, rather dense racemes; bracts ovate, very deciduous. April. *l.* verticillate in threes or fours, from obovate or obcordate to linear-cuneate, very obtuse or truncate, emarginate; margins recurved, coriaceous, reticulate, glabrous above, usually pubescent underneath. Branches rather stout, angular, minutely silky pubescent. An elegant species. SYN. *G. emarginatum.*

GASTRONEMA. A synonym of **Cyrtanthus** (which *see*).

GATHERING. *See* **Fruit Gathering.**

GAUB, or GAB. Indian names for the astringent fruits of *Diospyros Embryopteris.*

GAUDICHAUDIA (named in honour of Charles Gaudichaud, who accompanied Freycinet as naturalist in his voyage round the world, 1817-20). ORD. *Malpighiaceæ.* A genus comprising twelve species of graceful, mostly twining stove shrubs, inhabitants of Mexico, New Grenada, and Venezuela. The species of this genus, like those of some other genera of the same family, are remarkable for constantly producing two kinds of flowers. Flowers yellow; petals sometimes perigynous, roundish, spreading. In the more imperfect flowers, the petals are either rudimentary or altogether absent. Leaves opposite, entire. The species given below is the one in general cultivation. For culture, *see* **Galphimia.**

Gaudichaudia —*continued.*

G. cynanchoides (Cynanchum-like). *fl.* yellow, in axillary or terminal crowded racemes. *l.* stalked. *h.* 10ft. Mexico, 1824.

GAULTHERIA (named in honour of Gaulthier, a physician and botanist of Canada). Aromatic Winter-

FIG. 87. FLOWERING BRANCH OF GAULTHERIA PROCUMBENS (CREEPING WINTERGREEN).

green. SYN. *Gualtheria.* ORD. *Ericaceæ.* A genus comprising about ninety species of very ornamental hardy or greenhouse small trees or shrubs, inhabitants of the

FIG. 88. GAULTHERIA SHALLON.

Gaultheria—*continued.*

American continent. A few are found in Asia, five or six occur in Tasmania and New Zealand, and one is Japanese. Flowers white, pink, or red, axillary and terminal, racemose, rarely solitary ; corolla urceolate or campanulate, five-lobed ; lobes spreading or recurved, imbricated. Leaves coriaceous, persistent, alternate, rarely opposite, often serrate or serrulate, penninerved. The hardy species thrive in a peat soil, and are readily increased by division or by layers. The greenhouse kinds should be treated like other greenhouse shrubs. The species enumerated below are those best known to cultivation. *G. procumbens* does well in the ordinary peat border ; and *G. Shallon* is well adapted for growing on rockwork, or as edgings.

G. antipoda (antipodal).* *fl.* white or pink, small, axillary and solitary, or crowded towards the ends of the branchlets. *l.* very coriaceous, veined, shortly petioled, orbicular, oblong-lanceolate or linear-lanceolate, acute, obtuse, or acuminate. *h.* 6ft. New Zealand, 1820. Greenhouse.

G. ferruginea (rusty-coloured).* *fl.* pink ; racemes bracteate, erect, rising from the axils at the tops of the branches, the whole forming a panicle. June. *l.* ovate, acute, shining above, with serrulately scabrous margins, clothed with rusty tomentum beneath, as well as the racemes and flowers. A dwarf shrub, or small tree. Brazil, 1852. Greenhouse. (B. M. 4697.)

G. fragrantissima (very fragrant).* *fl.* secund, drooping, shortly pedicelled ; racemes axillary, strict, erect, or inclined, shorter than the leaves, many-flowered, pubescent ; corolla white or pale pink, mouth small ; lobes rounded. April. *l.* very variable in shape, elliptic, ovate, obovate, or lanceolate, acute or acuminate. Branches stout, obtusely angled, shining. Himalayas, 1869. A handsome greenhouse plant (quite hardy in some parts of Ireland). (B. M. 5984.)

G. procumbens (procumbent).* Canada Tea ; Creeping Wintergreen. *fl.* white, few, terminal, nutant, solitary. July. Berries red, edible. *l.* obovate, acute at the base, finely and ciliately toothed. Stems procumbent ; branches erect, naked at bottom, but with crowded leaves at top. North America, 1762. Hardy. See Fig. 87. (B. M. 1966.)

G. scabra (scabrous). *fl.*, racemes axillary, simple ; calyx and bracts clothed with glandular hairs. Summer. *l.* ovate-cordate, acute, toothed, scabrous, reticulately veined beneath. Caraccas. Greenhouse.

G. Shallon (Salal).* *fl.*, corolla white, tinged with red, downy, urceolate, with a closed limb ; racemes secund, bracteate, downy. May. Berries purple, globose, acute, fleshy. *l.* ovate, subcordate, serrate, glabrous on both surfaces. North-west America, 1826. Plant procumbent, hairy. The berries of this hardy species have a very agreeable flavour, and make excellent tarts. See Fig. 88. (B. M. 2843 ; B. R. 1411.)

GAURA (from *gauros*, superb ; in reference to the elegance of the flowers of some of the species). ORD. *Onagrarieæ*. A genus comprising about twenty species of hardy annual or perennial herbs, rarely shrubs, natives of the warmer parts of North America. Flowers in terminal, spiral racemes. Leaves alternate, simple. But few of the species are now to be found in cultivation. A light soil suits Gauras best, and they can only be propagated by seed, which should be sown early in spring, in the open ground. As soon as the seedlings are large enough to handle, they should be transferred to their flowering quarters, and a slight covering afforded them during severe weather.

G. biennis (biennial). *fl.* irregular ; petals at first white, then reddish, obovate, ascending, spreading, naked ; sepals purple at the apex. August to October. *l.* lanceolate-oblong, acute, denticulated. *h.* 4ft. to 6ft. 1762. (B. M. 389.)

G. Lindheimeri (Lindheimer's).* *fl.* rose-white, produced in numerous elegant spikes throughout the summer. *h.* 4ft. Texas, 1850. Annual or perennial. An elegant slender branching species for masses or mixed borders. See Fig. 89. (L. & P. F. G. 3, 127.)

G. parviflora (small-flowered). *fl.* yellow, minute, crowded ; spikes elongated. August. *l.* oblong, acuminated, remotely denticulated, and ciliated on the margins, rather velvety when young. *h.* 1ft. to 1½ft. 1835. Annual. (B. M. 3506.)

GAUSSIA (a commemorative name). ORD. *Palmeæ*. A genus of two or three species of ornamental, medium-sized, unarmed palms, with pinnatisect leaves, from the West Indian Islands. They are nearly allied to **Chamædorea** (which *see* for culture). *G. Ghiesbreghtii* (SYNS. *Chamædorea Ghiesbreghtii* and *Oreodoxa ventricosa*) and *G. princeps* are in cultivation in this country.

GAYLUSSACIA (named in honour of N. F. Gay-Lussac, a celebrated French chemist, 1778-1850). SYN. *Lussacia*. ORD. *Vacciniaceæ*. A genus of about forty species of very ornamental, but little grown, greenhouse or half-hardy evergreen or deciduous shrubs, natives of tropical America. Flowers white or scarlet, small, disposed in few or many-flowered axillary racemes. Leaves alternate, persistent, rarely membranaceous, and deciduous, entire or serrate, terminated by a hard spine. For culture, *see* **Vaccinium**.

G. dumosa (low). *fl.* white to rose-red ; corolla bell-shaped ; bracts leaf-like, as long as the pedicels ; racemes elongated. June. *fr.* black. *l.* deciduous, entire, obovate-oblong, mucronate, green on both sides, rather thick and shining when old. *h.* 1ft. to 5ft. North America, 1774. (B. M. 1106, under name of *Vaccinium dumosum*.

G. frondosa (leafy).* *fl.* greenish-purple ; corolla globular, bell-shaped ; bracts deciduous, shorter than the slender drooping pedicels ; racemes slender, loose. May and June, *fr.* dark blue, with a white bloom, sweet and edible. *l.* deciduous, entire, obovate-oblong, blunt, pale, glaucous beneath. Branches slender and divergent. *h.* 3ft. to 6ft. North America, 1761. (A. B. R. 140, under name of *Vaccinium frondosum*.)

G. pseudo-vaccinium (false Vaccinium). *fl.* crimson ; racemes axillary, erect, secund, bracteate. May. *l.* elliptic-lanceolate, obsoletely serrated towards the top. *h.* 1ft. to 2ft. Brazil, 1843. Greenhouse. SYN. *Vaccinium brasiliensis*.

G. resinosa (resinous).* *fl.* reddish ; corolla ovoid-conical, or at length cylindrical, with an open mouth ; bracts and bractlets small and deciduous ; racemes short, clustered, one-sided ; pedicels as long as the flowers. May and June. *fr.* black, without bloom, pleasant (very rarely white). *l.* deciduous, entire, oval, oblong-ovate, or oblong, thickly clothed and (as well as the flowers) at first clammy with resinous globules. *h.* 1ft. to 3ft. North America (in woodlands and swamps), 1782. (B. M. 1288, under name of *Vaccinium resinosum*.)

FIG. 89. FLOWERING BRANCH OF GAURA LINDHEIMERI.

GAZANIA (named in honour of Theodore Gaza, 1393-1478, a learned Greek translator of the botanical works of Theophrastus into Latin). SYNS. *Mœhnia* and *Mussinia*. ORD. *Compositæ*. A genus comprising twenty-four species of very showy plants, natives of the Cape of Good Hope. Flower-heads large and handsome, with yellow strap-shaped ray-florets and tubular disk-florets, usually of a darker colour. Leaves alternate or radical, entire or pinnatisect. Gazanias are of easy culture, in a cool greenhouse, or in the open border, in summer. A compost of loam and peat is most suitable. Propagation is rapidly effected, in July or August, by cuttings, made from the side shoots near the base of the plant; these should be inserted in sandy soil, and in a close frame.

G. Pavonia (peacock).* *fl.-heads* large, handsome; ray-florets with brown spot at the base, or white central dot, and a green tinge. July. *l.* pinnatifid, hairy. *h.* 1½ft. 1864. A very handsome plant. (B. R. 35.)

G. rigens (stiff). *fl.-heads* brilliant golden colour, with an interior black velvet band. June. *l.* linear, spathulate, hairy. *h.* 1ft. 1755. (B. M. 90.) From this and *G. uniflora*, the several garden varieties have been raised.

G. splendens (splendid).* *fl.-heads* large; ray-florets bright orange, with a black and white spot at the base of each; disk paler. *l.* linear-spathulate, silky, white beneath. *h.* 1½ft. A very handsome and much-grown trailer, of supposed hybrid origin.

G. uniflora (one-flowered).* *fl.-heads* yellow; ray-florets same colour as disk. July and August. *l.* spathulate-lanceolate, downy beneath. Stem shrubby, decumbent. *h.* 1ft. 1816. (B. M. 2270.)

GEAN. The wild Cherry, **Cerasus Avium** (which *see*).

GEASTER. In the southern parts of England, Earth Stars—for so the species of *Geaster* are called—are now and then found in shrubberies. Some of them are extremely sensitive to moisture, and are driven

FIG. 90. GEASTER HYGROMETRICUS.

about by the wind as shapeless masses (see Fig. 90, *a*), till the first shower expands them, as in Fig. 90, *b*.

GEBLERA. Included under **Securinega.**

GEERIA. A synonym of **Eurya** (which *see*).

GEISSOIS (from *geisson*, house-tiling; the seeds are imbricated like the tiles on a house). ORD. *Saxifrageæ*. A genus comprising about four species of stove evergreen trees, natives of New Caledonia, the Fiji Islands, and Australia. *G. racemosa*, perhaps the only species yet introduced, is a handsome tree, requiring a very sandy loam, to which a small quantity of peat may be added. Cuttings root if inserted in sand, under a hand glass, in heat.

G. racemosa (racemose). *fl.* crimson; racemes axillary, many-flowered, solitary, or in threes, produced from the old wood. *l.* opposite, petiolate, quinate; leaflets elliptic, obtuse, quite entire; stipules oblong, ribbed, undivided. *h.* 20ft. New Caledonia, 1851.

GEISSOMERIA (from *geisson*, a tile, and *meris*, a part; the imbricated bracts fall over each other like tiles on a roof). SYN. *Salpixantha*. ORD. *Acanthaceæ*. A genus containing about ten species of stove evergreen, pubescent or glabrous shrubs, of which one is from Jamaica and the rest from Brazil or Guiana. Flowers red, often velvety, long, in simple terminal spikes or paniculate racemes; calyx five-parted; corolla tubular, dilated upwards. Leaves oval or oblong, entire. Stems

Geissomeria—*continued.*

tetragonal. The plants thrive in a compost of loam and peat, with the addition of sand and a little rotten cow-dung. Cuttings, procured from rather firm shoots, root easily during summer, if inserted in sandy soil, covered with a bell glass, and placed in bottom heat. The species best known to cultivation are those described below.

G. coccinea (scarlet).* *fl.* scarlet, sessile, decussate in loose spikes; peduncles axillary, solitary, pendulous, or terminal by threes. August. *l.* ovate, coriaceous, entire. *h.* 3ft. Jamaica, 1842. (B. M. 4158, under name of *Salpixantha coccinea*.)

G. longiflora (long-flowered). *fl.*, corolla scarlet, tubular, velvety, with an arcuate, clavate, somewhat ventricose tube, which is smooth inside; spikes terminal and axillary. October. *l.* opposite, ovate-lanceolate, wavy, sessile, tapering to the base, smooth above, somewhat pubescent beneath, silky at the veins. *h.* 3ft. Brazil, 1826. A splendid free-flowering plant. (B. R. 1045.)

GEISSORHIZA (from *geisson*, a tile, and *rhiza*, a root; referring to the dry coats which cover the bulbs, like the tiles on a roof). Tile Root. ORD. *Irideæ*. A genus of about twenty-four species of very pretty greenhouse or half-hardy bulbous plants, natives, for the most part, of the Cape of Good Hope. Flowers Ixia-like, variable in colour, very showy; perianth funnel-shaped, with a short tube, and an ample, six-parted, nearly equal limb. Leaves narrow, setaceous, or sword-shaped. Bulbs covered by the scarious remains of the bases of the leaves, which lie over each other like the tiles of a roof, and hence the common name. For culture, *see* **Galaxia.** The following are a selection of the species usually seen in cultivation:

G. excisa (abrupt-leaved). *fl.* white. April and May. *l.*, radical ones ovate-oblong. *h.* 6in. 1789. (B. M. 584, under name of *Ixia excisa*.)

G. grandis (large-flowered).* *fl.* inclined; perianth segments pale straw-coloured, with a blood-red midrib, elliptic-obovate, obtuse, patent; spike six to eight-flowered. May. *l.* radical, linear-ensiform, obtuse, green, strongly ribbed towards the base. Stem stout, leafy throughout. 1868. (B. M. 5877.)

G. inflexa (bending).* *fl.* very large and handsome; perianth petal-like; tube very short, slender at the base; segments of a bright yellow, each marked at the base with an obcordate dark purple or velvet spot. May. *l.* ensiform, acute, falcate, or obliquely bent. *h.* 1½ft. 1824. One of the handsomest species of the genus; closely allied to *G. obtusata*. SYN. *G. vaginata*. (S. B. F. G. 138.)

G. obtusata (blunt). *fl.* yellow. May. *l.*, radical ones ensiform-linear, obtuse. *h.* 1ft. 1801. (B. M. 672.)

G. Rochensis (De la Roche's).* *fl.* blue, crimson-spotted centre May. *l.* radical, linear, acute. Stem smooth. *h.* 9in. 1790. (B. M. 598, under name of *Ixia Rochensis*.)

G. secunda (side-flowering). *fl.* white. May. *l.*, radical ones linear-acute. Stem villous. *h.* 1ft. 1795. (B. M. 1105, under name of *Ixia secunda*.)

G. setacea (bristle-leaved). *fl.* sulphur-coloured. June and July. *l.*, radical ones bristly. Stem simple, few-flowered. *h.* 1ft. 1809. (B. M. 1255.)

G. vaginata (sheathed). A synonym of *G. inflexa*.

GELASINE (from *gelasinos*, a smiling dimple; a poetic allusion to the delicacy of the flowers). ORD. *Irideæ*. *G. azurea* is a pretty hardy bulbous plant, native of South America. For culture, &c., *see* **Romulea.**

G. azurea (blue). *fl.* blue; petals dotted with white and black at base; spathe many-flowered, shorter than peduncles; peduncles clasped closely by three or four bracts. May. *l.* plicate, 1½ft. to 2ft. long. *h.* 1ft. 1838. (B. M. 3779.)

GELONIUM. This genus is now included, by the authors of the "Genera Plantarum," under **Ratonia** (which *see*).

GELSEMIEÆ. A tribe of *Loganiaceæ*.

GELSEMIUM (from *Gelsemino*, an Italian name of the Jessamine). SYNS. *Leptopteris* and *Medicia*. ORD. *Loganiaceæ*. A genus comprising three species of twining glabrous shrubs, one from North America, another from Sumatra, and the third from China. Flowers yellow, showy; corolla infundibuliform; tube sub-cylindrical; throat dilated. Leaves opposite, membranaceous. *G. sempervirens*, the only species yet known to cultivation, is a

Gelsemium—*continued.*

half-hardy shrub. It thrives in a rich loamy soil, and may be propagated by cuttings, placed under a hand glass.

G. nitidum (shining). A synonym of *G. sempervirens.*

G. sempervirens (evergreen). *fl.* fragrant; corolla deep yellow, over 1in. long; peduncles very short, axillary; stigmas of one form and anthers of the other protruding. Spring. *l.* evergreen, thin-coriaceous, shining, oblong or ovate-lanceolate, 1½in. to 2in. long. Stem slender. Southern United States, 1840. SYN. *G. nitidum.*

GEMINATE. United in pairs.

GEMINIFLOROUS. Twin-flowered; when two flowers grow together.

GENETYLLIS. A synonym of **Darwinia** (which *see*).

GENICULATE. Bent abruptly, like a knee, *e.g.*, the stems of many grasses.

GENICULUM. The node of a stem.

GENIPA (from Genipapo, the Guiana name of one of the species). Genip-tree. ORD. *Rubiaceæ.* A genus comprising about eight species of stove evergreen shrubs or small trees, natives of tropical America and the West Indian Islands. Flowers white, at length yellow, axillary or terminal, solitary or few; corolla narrow, campanulate; tube short; throat glabrous or villous. Fruit succulent, with a rather thick rind, crowned by the calyx, and tapering at each end. Leaves sessile or shortly pedunculate, opposite, coriaceous, obovate, or lanceolate, clear; stipules interpetiolar, ovate, acuminated, deciduous. For culture, *see* **Gardenia,** to which the genus is closely allied. The species enumerated below flower in summer.

G. americana (American). Genipap Fruit. *fl.* small; peduncles axillary, dichotomous, corymbose. *fr.* greenish-white, large, full of dark purple juice; pulp edible, rather acrid. *l.* oblong-lanceolate, quite glabrous on both surfaces. *h.* 20ft. to 30ft. West Indian Islands, &c., 1779.

G. Caruto (native name). *fl.*, corolla white, having the tube silky both inside and outside; peduncles terminal, two or three-flowered. *l.* obovate, obtuse, glabrous above, clothed with velvety tomentum beneath. *h.* 20ft. West Indian Islands, &c.

G. Merianæ (Merian's). *fl.* nearly sessile, crowded at the tops of branches. Berry hairy, umbilicate; pulp edible. *l.* oblong-ovate. *h.* 20ft. Guiana, 1800.

G. oblongifolia (oblong-leaved). *fl.* crowded at the tops of the branches, on short pedicels, and disposed somewhat racemosely. *fr.* the size of a peach. *l.* oblong-ovate, obtuse, shining above, and downy on the nerves beneath, with rather revolute margins. *h.* 20ft. Peru, 1821. The seeds and pulp of the fruit of this species are used by the Indians as a dye.

GENIPAP FRUIT. *See* **Genipa americana.**

GENIP-TREE. *See* **Genipa.**

GENISTA (the old Latin name used by Virgil). ORD. *Leguminosæ.* A large genus (about seventy species have been described) of pretty dwarf-growing unarmed or prickly, greenhouse or hardy shrubs, natives of Europe, Northern Africa, and Western Asia. Flowers yellow, rarely white, produced either singly or in clusters from the angles of the leaves, or at the ends of the branches. Leaves simple or trifoliolate. The hardy species are very pretty plants for growing on rockwork, in almost any ordinary soil, where they will flower continuously throughout the summer. All hardy, except where otherwise stated. For general culture, *see* **Cytisus.**

G. ætnensis (Etna). *fl.*, racemes terminal. June and July. *l.* few, linear, silky. *h.* 6ft. to 15ft. Sicily and Sardinia, 1816. Plant erect, much branched. (B. M. 2674, under name of *Spartium ætnensis.*)

G. anglica (English). Needle Furze; Pettywhin. *fl.*, racemes few-flowered, terminal; floriferous branches unarmed. Summer. *l.* ovate-lanceolate; spines simple. Root woody, long, creeping. *h.* 1ft. to 2ft. Europe (Britain). Plant smooth. (Sy. En. B. 326.)

G. anxantica (Anxantic). *fl.* racemose. Summer. *l.* ovate-elliptic, rather coriaceous, veiny. Branches angular; stems diffuse. Naples, 1818. Plant quite diffuse. (S. F. G. ii. 266.)

G. ephedroides (Ephedra-like). *fl.* rather silky, alternate, spicate. Summer. *l.* few, sessile, trifoliolate, and simple; leaflets linear, smoothish. Branches spinescent, stiff, terete, at length striated. *h.* 2ft. to 3ft. Corsica and Sardinia.

G. hispanica (Spanish). *fl.*, racemes terminal, somewhat capitate; floriferous branches unarmed. Summer. *l.* lanceolate, villous; spines branched, stiff. *h.* 6in. to 12in. South-western Europe, 1759. (L. B. C. 1738.)

Genista—*continued.*

G. ovata (ovate). *fl.* in short racemes. Summer. *l.* ovate, or ovate-oblong, hairy. Stems numerous, hairy, erect, somewhat herbaceous, striated, terete. *h.* 2ft. to 4ft. Central and Southern Europe, 1816. (L. B. C. 482.)

G. pilosa (hairy). Greenweed. *fl.* axillary, on short pedicels. Summer. *l.* obovate-lanceolate, obtuse, complicated, downy. Stem procumbent, striated, branched. Europe (Britain). (Sy. En. B. 327.)

G. radiata (rayed). *fl.*, heads two to four-flowered, terminal. Summer. *l.* trifoliolate, nearly sessile, opposite; leaflets linear, rather silky. Branches angular, crowded, glabrous. *h.* 1ft to 3ft. South Europe, 1758. (B. M. 2260, under name of *Spartium radiatum.*)

G. Retama (Retam). *fl.* white, silky; racemes lateral, few-flowered. Summer. *l.* very few, linear-oblong, pubescent. Branches erect, slender, twiggy, flexible. *h.* 2ft. to 4ft. Spain, Portugal, &c., 1670. (B. M. 683, under name of *Spartium monospermum.*)

G. sagittalis (arrow-jointed). *fl.* disposed in an ovate, terminal, leafless spike. Spring. *l.* ovate-lanceolate. Stems prostrate; branches herbaceous, ascending, two-edged, membranous. *h.* 6in. South Europe, 1750.

G. tinctoria (dyers'). Dyers' Greenweed. *fl.* disposed in spicate racemes, smooth. Spring and autumn. *l.* lanceolate, smoothish. Stems erect; branches terete, striated, erect. *h.* 1ft. to 2ft. Europe (Britain), North and West Asia. This species, of which there is a very pretty double-flowered form, yields a yellow dye.

G. triangularis (triangular). *fl.*, racemes terminal, short. Summer. *l.* trifoliolate, the upper ones simple; leaflets ovate-lanceolate, villous. Branches triquetrous, decumbent. *h.* 2ft. to 4ft. South Europe. (B. M. 314, under name of *G. triquetra.*)

G. virgata (twiggy). *fl.* silky, disposed in something like racemes. March. *l.* oblong-lanceolate, rather silky. Branches twiggy, terete, striated. *h.* 3ft. to 4ft. Madeira, 1777. (B. R. xxx. 11.)

GENTIAN. *See* **Gentiana.**

GENTIANA (*Gentiane*, a name used by Dioscorides, so called in honour of Gentius, a King of Illyricum, who imprisoned the Roman Ambassadors at the request of Perseus, King of Macedonia; he is said to have been the first who experienced the virtues of Gentian). Gentian. SYN. *Selatium.* Including *Pneumonanthe.* ORD. *Gentianeæ.* A large genus (about 180 species) of hardy, annual or perennial herbs, dispersed throughout temperate and alpine (rare in Arctic) regions. Flowers blue, violet, purple, yellow, or white, axillary and terminal, sessile or rarely pedunculate, erect. Leaves opposite, often sessile. Gentians are among the most beautiful of hardy plants, and some have flowers of a deeper and more intense blue colour than can be found in almost any other genus. Unfortunately, they are, in many localities, most difficult to establish; and some species, *G. verna* for instance, can rarely be induced, under artificial conditions, to increase and blossom as it does in a natural state. All Gentians are extremely sensitive of root disturbance, caused by their being divided or transplanted; consequently, any that are established should be allowed to remain, unless their removal is an absolute necessity.

Propagation is effected by seeds, which ripen in this country; and, in one or two instances, by division of the plants, although this is not recommended, for the reasons already given. *G. acaulis* withstands division, perhaps, better than any of the others, and, being rather plentiful, it is frequently used as an edging plant, more especially in Scotland, and in some of the cooler parts of England. Early in spring, just as growth commences, is the best time for division, which should be carefully performed, without undue injury being caused to the roots. Species like *G. cruciata,* which have their flower-stems proceeding from one rootstock, will not admit of increase by this method. Seeds are slow in vegetating, especially if they are old, or have been stored in a very dry place. When gathered from home-grown plants, they should be sown as soon as ripe; and, if this is done during the latter part of summer, germination may be expected (although it does not always take place) the following spring. If seeds are imported or purchased from nurserymen, the process may take one or two years, and

Gentiana—*continued.*

then be uncertain. Well-drained pots or pans should be prepared, and filled with a compost consisting chiefly of loam and sand, made rather fine. The seeds must only be lightly covered and watered, the pans being afterwards wintered in a frame from which frost is merely excluded. Raising Gentians from seed is a slow process, requiring considerable care in watering, and in potting or pricking off the young plants, so as to avoid injury to the tender roots. But little growth will be made by the majority of perennial species during the first year, and they should not be fully exposed outside, at least

Gentiana—*continued.*

species; and those which are very dwarf alpines, from high elevations, should be provided with a place on rockwork, specially prepared to insure sufficient moisture at the season when it is required. A cool place should be selected for the treatment of the species from the Himalayas. Any that are difficult to manage, and are not found to succeed, should be provided with a top-dressing of new soil, or other extra attention, in preference to lifting them, unless the proper and requisite cultural requirements have been neglected when planting in the first place. In Scotland, *G. verna* is successfully

FIG. 91. GENTIANA ACAULIS.

before the second season. It usually takes three or four years to obtain sizes large enough for flowering.

Cultivation. Nearly the whole of the Gentians require plenty of moisture when making their growth, although thorough drainage is also essential. To insure this, extra attention should be given in the first place, and permanent positions selected. Some species succeed fairly well in various situations, either with or without shade. A good depth of loamy soil, having stones intermixed, and some of the latter placed round the plants, is the best preparation for them, this mixture requiring the addition of some peat for such as have thick stocks or long tap roots. An open position at the base of rockwork, or in the open border, should be chosen for the taller-growing

cultivated in pans, being planted and left undisturbed, with the exception of an annual top-dressing. The pans, with their contents, are wintered in cold frames, and plunged, in spring, in the open ground, where the plants flower and remain for the summer. Stones are most useful round the roots of those planted out, on account of the moisture which they retain in dry weather. All the species described below are perennials.

G. acaulis (stemless).* Gentianella. *fl.* blue, with five yellow marks inside, very large, 2in. long; corolla campanulate; segments obtuse, mucronate. March to May. *l.* opposite, decussate; radical ones crowded, imbricated. Stems tetragonal, one-flowered. *h.* 2in. to 4in. Alps and Pyrenees. See Fig. 91. (B. M. 52.) There are several forms of this handsome species.

G. adscendens (ascendent). *fl.* blue; corolla campanulate,

Gentiana—*continued.*

five-cleft, toothed between the segments; calyx three-toothed, opening on one side. June and July. *l.* lanceolate. *h.* 9in. Siberia, 1799. (B. M. 705.) There is a form of this species, *minor* (B. M. 723).

FIG. 92. FLOWERING BRANCHES OF GENTIANA AFFINIS.

G. affinis (related).* *fl.* blue; corolla narrowly funnel-shaped, 1in. or less long; calyx lobes linear or subulate, unequal. Summer. *l.* from oblong or lanceolate to linear. Stems clustered, 4in. to 12in. high. North America. See Fig. 92.

G. algida (cold).* *fl.* milk-coloured, marked with bluish dots and stripes; limb of a livid blue colour, terminal and lateral, pedicellate; corolla ten-cleft, campanulate, large. June and July. *l.* linear-lanceolate. Stems obsoletely tetragonal, or nearly terete. *h.* 3in. to 6in. Siberia, 1808. See Fig. 93.

G. Andrewsii (Andrews's).* *fl.* blue, crowded, in axillary and terminal fascicles, sessile; corolla campanulately ventricose, with five obtuse entire segments, and five smaller accessory fringed ones. August. *l.* oblong-lanceolate. Stems terete. *h.* 1ft. to 2ft. North America, 1776. (B. M. 6421.)

G. asclepiadea (Swallow-wort-like).* *fl.*, terminal ones crowded, axillary ones solitary, all nearly sessile; corolla large, campanulate, three times longer than the calyx, five-cleft; segments ovate, acute. July. *l.* ovate-lanceolate, stem-clasping, with

Gentiana—*continued.*

repand edges. Stems obsoletely tetragonal. *h.* 6in. to 18in. Southern and Eastern Europe, 1629. (B. M. 1078.)

G. bavarica (Bavarian).* *fl.* deep blue; corolla funnel-shaped, ten-cleft; segments entire, or slightly serrated, the accessory ones small, horn-formed. July. *l.* ovate, obtuse; radical ones crowded, imbricated, longer than the cauline ones. Stems one-flowered. *h.* 3in. Central Europe, 1775.

G. Burseri (Burser's). *fl.* yellow, verticillate; corolla usually five-cleft, campanulate, dotted; segments lanceolate, with a small accessory tooth between each. July. *l.* opposite, ovate, apiculated, sheathing at the base. *h.* 2ft. Pyrenees, 1820.

G. Catesbæi (Catesby's). *fl.* pale blue, terminal, fasciculate; corolla ten-cleft, campanulate, somewhat ventricose or barrel-shaped; the five regular segments acutish, the five accessory ones jagged. August. *l.* short, elliptic-ovate, acute, with scabrous edges. Stem terete, minutely downy. *h.* 6in. to 12in. Carolina, 1803.

G. ciliata (fringed). *fl.* light blue; corolla four-cleft; segments serrated, finely cut in the middle. August and September. *l.* lanceolate and linear. Stem flexuose, angular. *h.* 9in. Germany, 1759. (B. M. 639.)

G. crinita (hairy). *fl.* light blue; corolla four-cleft; segments finely cut. June and July. *l.* lanceolate, acute. Stem erect, rounded. *h.* 6in. North America, 1804. (B. M. 2031.)

G. cruciata (crossed).* *fl.* terminal and axillary, crowded, nearly sessile; corolla tubularly campanulate, eight-cleft (regular segments acute, four accessory ones small, acutely bifid or jagged), with a pale tube, widened upwards, and a pale blue limb, dotted with green in the throat. June and July. *l.* broad-lanceolate, connate at the base. Stems ascending, terete. *h.* 6in. Europe, 1596.

G. Fortunei (Fortune's).* *fl.* axillary, solitary, sessile; corolla funnel-shaped, slightly ventricose; limb of five spreading cordate-ovate lobes, deep blue, and equally spotted with white. December. *l.* opposite, the lowest small and ovate, the rest lanceolate, glabrous, three-nerved. North China, 1853. A very handsome greenhouse species. (B. M. 4776.)

G. gelida (ice-cold). *fl.* axillary and terminal, aggregate; corolla campanulate, with bluntish segments, the five accessory ones short and jagged. June and July. *l.* lanceolate. Stems ascending, tetragonal. *h.* 6in. Caucasus, 1807.

G. intermedia (intermediate). A synonym of *G. ochroleuca.*

G. Kurroo (native name).* *fl.* erect or inclined, pedicellate; corolla tube narrowly campanulate; lobes five, broadly ovate, acute or acuminate, azure-blue, sprinkled towards the throat with white. October. *l.* elongate-linear or oblong-lanceolate, obtuse or acute, concave, very coriaceous, bright green. Himalaya Mountains, 1879. A very handsome plant for the rock garden. SYN. *Pneumonanthe Kurroo.* (B. M. 6470.)

G. linearis (linear-leaved). *fl.* blue, one to five, in a terminal

FIG. 93. GENTIANA ALGIDA, showing Habit, and detached Portion of Inflorescence (enlarged).

Gentiana—*continued.*

involucrate cluster; corolla 1in. or more long; calyx lobes shorter than the tube. Summer. *l.* linear or narrowly lanceolate. Stem slender, 1ft. to 2ft. high. North America. SYN. *G. Pseudo-pneumonanthe.*

G. lutea (yellow).* *fl.* verticillate, sub-cymose; corolla yellow, veiny, and spotted, rotate, five or six-cleft. July. *l.* broad, ovate; radical leaves ovate-oblong; cauline ones sessile, ovate, acute. *h.* 4ft. to 6ft. Europe, 1596. This species furnishes the Gentian root of commerce.

G. macrophylla (large-leaved). *fl.* terminal, verticillately aggregate, involucrated by usually four floral leaves; corolla pale blue, small, tubularly campanulate, four or five-cleft, with short acutish segments. July. *l.*, radical ones lanceolate, length of stem. Stems nearly terete, almost naked in the middle. *h.* 6in. to 12in. Siberia, 1796. (B. M. 1414.)

G. ochroleuca (yellowish-white). *fl.* blue, terminal, aggregate; calyx foliaceous, unequal; corolla ventricose, five-fid. *l.* obovate-oblong, three-nerved. *h.* 6in. United States, 1820. SYN. *G. intermedia.* (B. M. 2303.)

G. ornata (adorned).* *fl.* solitary and sessile at the ends of the branches; corolla tube whitish, striped with blue, sub-cylindric, a little inflated; lobes intensely blue, five, small, triangular-ovate, acute. May. *l.* ovate-lanceolate or linear-lanceolate, acute, acuminate or obtuse, deep green, with a pale midrib. Himalayas. (B. M. 6514.)

G. pannonica (Pannonian). *fl.* verticillate, axillary, and terminal; corolla purple, beset with dots, campanulate, six or seven-cleft, rather membranous; tube yellowish. July. *l.*, radical ones ovate, apiculate; cauline ones ovate, lanceolate; floral ones acuminated. Stem obsoletely tetragonal. *h.* 1ft. to 2ft. Alps of Europe.

FIG. 94. GENTIANA PNEUMONANTHE, showing Habit and detached Single Flower.

G. Pneumonanthe.* Wind Flower. *fl.* terminal and axillary, pedunculate; corolla deep blue, having the accessory segments small and green, funnel-shaped, five-cleft. August. *l.* linear-spathulate, obtuse. Stems simple, tetragonal. *h.* 6in. to 12in. Northern hemisphere (Britain). See Fig. 94. There are white and other varieties of this species.

G. Pseudo-pneumonanthe (bastard Wind Flower). A synonym of *G. linearis.*

G. punctata (dotted).* *fl.* verticillate; corolla yellow, dotted with numerous irregular purple spots, campanulate, six to eight-cleft, large. June. *l.* ovate, acutish; lower ones petiolate, superior ones acuminated. Stem sub-tetragonal. *h.* 1ft. to 2ft. European Alps, 1775.

G. purpurea (purple). *fl.* from three to eight together, terminal, the axillary ones usually solitary; corolla purplish, marked with dots in lines inside, coriaceous, campanulate; tube striated with greenish-yellow. June, July. *l.*, radical ones ovate; cauline ones ovate-lanceolate; upper ones broad-lanceolate, combined and sheathing at the base. Stem obsoletely tetragonal. *h.* 1ft. to 2ft. Europe, 1768.

G. pyrenaica (Pyrenean).* *fl.* terminating the branches, solitary; corolla pale green outside, with the limb deep blue above, funnel-shaped, ten-cleft; the accessory segments oblong, obtuse, and crenulated at the apex. April. *l.* lanceolate-linear; radical ones crowded, imbricate; cauline connately sheathing, acute. Stem procumbent, branched at bottom. *h.* 3in. Pyrenees, 1825. (B. M. 5742.)

G. quinqueflora (five-flowered). *fl.* lilac, clustered at ends of stem and branches, three to five together; corolla clavate, five-fid; calyx very short, acute. October. *l.* amplexicaul, deltoid-cordate, three to five-nerved. *h.* 1½ft. North America, 1831. (B. M. 3496.)

FIG. 95. GENTIANA SEPTEMFIDA.

G. septemfida (seven-fid).* *fl.* terminal, one to seven in a cluster; corolla azure-blue, having the tube almost cylindrical, widening upwards, ten-cleft; five accessory segments jagged. June, July. *l.* ovate-lanceolate, obtuse, approximate. Stems tetragonal, erect, simple. *h.* 6in. to 18in. Persia, 1804. See Fig. 95. (B. M. 1229.)

G. s. cordifolia (heart-shape-leaved). *fl.* numerous, in a compact rather elongate head, sessile, or very shortly pedicellate; corolla dark blue, clavate; lobes five, small, ovate, sub-acute. June, July. *l.* all ovate-cordate, sub-acute, five-nerved, dark green above, spreading or deflexed, coriaceous, the upper often forming a sort of involucre. Asia Minor. This plant is often cultivated under the name of *G. gelida.* (B. M. 6497.)

G. verna (green).* *fl.* solitary; corolla azure-blue, salver-shaped, five-cleft, with as many small bifid accessory segments. April, May. *l.* ovate, acutish; radical ones spreading, crowded. Stem branched at bottom. *h.* 3in. England. (B. M. 491.) There are several varieties of this species, including *brachyphylla* (leaves lanceolate, roundish, very short) and *elongata* (stem elongated, filiform, nearly naked).

GENTIANEÆ. A large order of annual or perennial herbs, rarely shrubs. Flowers red, yellow, blue, white, or violet, showy, regular; calyx divided, persistent; corolla persistent, imbricate or induplicate, and often twisted in æstivation; stamens alternate with the lobes of the corolla. The leaves (alternate and trifoliolate in *Menyanthes*) are nearly always opposite (rarely whorled), entire, exstipulate, usually ribbed. There are about forty-nine genera, and 520 species, broadly dispersed through almost all parts of the world; some are found at high elevations, and others in hot tropical plains. Bitterness characterises the whole order. Illustrative genera are: *Chironia, Chlora, Erythræa, Gentiana, Limnanthemum, Lisianthus, Menyanthes,* and *Villarsia.*

GENTIANELLA. *See* **Gentiana acaulis.**

GEODORUM (from *ge*, the earth, and *doron*, a gift). ORD. *Orchideæ.* A small genus of stove terrestrial orchids, natives of East India. Scapes terminating in a nodding spike of flowers, which in some are of a pale green colour, the lip white, veined with purple or yellow lines; and in others blush, with a yellow spot on the lip. Leaves radical, lance-shaped or elliptical. Roots tuberous. The species thrive in fibrous peat, in a hot, damp stove, but require to be rested after the leaves have withered.

G. citrinum (lemon-coloured). *fl.* yellow, close; spike pendulous; lip somewhat spurred at base, blunt and entire at end; scape shorter than leaves. October to December. *l.* lanceolate. *h.* 1ft. East Indies, 1800. (B. M. 2195.)

G. dilatatum (swollen). *fl.* whitish flesh-colour, crowded; sub-labiato-campanulate, nodding; racemes many-flowered, sparsely imbricate. Summer. *l.* 6in. long, 3in. to 4in. broad, erect,

Geodorum—*continued.*

lanceolate; scape leaves short. *h.* 6in. to 12in. India, 1800. (B. R. 675.)

G. fucatum (painted). *fl.* sub-campanulate; sepals pink, linear-oblong, acute; lip ovate, concave, emarginate, entire; scapes radical, erect, clothed, recurved at apex. July. *l.* oblong-lanceolate, acute, plicate, long. *h.* 1ft. Ceylon, 1832. (B. R. 1687.)

GEOFFRÆA (named after Dr. M. E. F. Geoffroy, of Paris, 1672-1731, author of a Materia Medica). Bastard Cabbage-tree. SYN. *Geoffroya.* ORD. *Leguminosæ.* A genus comprising four species of stove evergreen thorny or unarmed trees, natives of tropical America. Flowers yellow, often fœtid, in simple racemes. Seeds edible. Leaves alternate, impari-pinnate; leaflets alternate or sub-opposite. Geoffræas thrive in a compost of loam and peat. Propagated by cuttings, made of ripened shoots, and inserted in sand, under a bell glass, in heat.

G. spinulosa (spinulose). *fl.*, racemes forming a spreading panicle. *l.*, leaflets ovate, obtuse, pubescent, and reticulated beneath; petioles winged. Branches covered with a spongy bark. Trunk unarmed. Brazil.

G. superba (superb). *fl.* yellow, in simple racemes the length of the leaves. *fr.* about the size and form of a walnut, having a greenish-yellow downy rind, a fleshy pulp, and a hard nut, inclosing a single seed. *l.* closely resembling those of the Tamarind-tree, shining and puberulous above, but glaucous and paler beneath. *h.* 24ft. Brazil. A magnificent tree.

GEOFFROYA. *See* **Geoffræa.**

GEONOMA (from *geonomos*, skilled in agriculture; the allusion is obscure). ORD. *Palmeæ.* A genus of about a hundred species of very elegant dwarf-growing stove palms. Flowers monœcious, disposed on simple or branched spikes. Fruit a small, dry, oval berry. Leaves entire, or more or less pinnately divided, usually of a pale green colour. The present genus is allied to *Chamædorea*, but is less useful for decorative purposes. Geonomas thrive in a compost of two-thirds spongy peat and one of loam, with the addition of a little sand or charcoal. A plentiful supply of water is needed—"indeed, many of them grow best when plunged in a tank; and should any of them fall into bad health, if stood in a tank of water, with a little extra heat, they will speedily recover." They should be confined to the stove, as the constitution of the plants will not admit of their being employed in a permanent manner for indoor decoration; but they may be occasionally used for the dinner table. Nearly all the species are exceedingly handsome, especially in a young state. Propagated by seeds and suckers only.

G. arundinacea (reed-like). *l.* dark green (brown when young), bilobed. Stems cæspitose, cane-like. (G. C. 1872, p. 78.)

G. binervis (two-nerved). *l.* pinnate, pendent, 2ft. to 4ft. long; pinnæ decurrent at base, tapering to a tail-like point, 6in. to 12in. long, dark green; petiole clothed with a network of rough brown fibres. Stem slender. Nicaragua.

G. Carderi (Carder's).* *l.* pinnate, strongly ribbed; pinnæ unequal, ½in. to 2½in. broad, upper part confluent into a broad bilobed apex; petioles flat on the upper, rounded and asperous on the lower, face. Columbia, 1876.

G. congesta (crowded).* *l.* 1ft. to 2ft. long, either entire or with a bifid apex, or divided into broad segments, widening upwards; 6in. to 8in. across at the apex; petioles sheathing at base. Stem moderately thick. Costa Rica.

G. elegans (elegant).* *l.* 1ft. long; terminal pinnæ broad, bifid; two lateral pairs broad, decurrent; bright pink when young; petioles sheathing at base. Stem slender, reed-like. Brazil.

G. ferruginea (rusty). *l.* arched, pinnate, 1ft. to 2ft. long, about 8in. broad; terminal one bifid; two lateral pairs broad, sessile; petioles and stems slender. Brazil.

G. Ghiesbreghtiana. *See* **Calyptrogyne Ghiesbreghtiana.**

G. gracilis (slender).* *l.* pinnate, arching, with long linear pinnæ, dark green. A graceful species, resembling *Cocos Weddeliana.* Brazil, 1874.

G. macrostachys (large-spiked). *l.* 1ft. to 1½ft. long, usually divided into three pairs of broad segments, ending in tail-like points, deep red when young; petioles light brown, sheathing at the base, tomentose. Stem slender. Brazil, 1823.

G. magnifica (magnificent). *l.* 2ft. to 3ft. long, 9in. to 12in. broad, plaited, unequally pinnate; apex deeply bifid; petioles blackish, sheathing. Stem somewhat stout. Chipias.

Geonoma—*continued.*

G. Martiana (Martius').* *l.* 1ft. to 2ft. long, 2in. across at the base, gradually increasing to the deeply bifid apex, where it is 9in. wide, reddish-crimson when young; petioles sheathing at base, 6in. long. Stem rather stout. Costa Rica. An extremely beautiful palm, the mature colour of the leaves being a deep metallic green. There is a form known as *Seemannii* sometimes grown.

G. Porteana (Porte's).* *l.* pinnate, 1ft. to 2ft. long, arched; pinnæ sessile, distant, 6in. to 8in. long, 2in. broad; apex deeply bifid. Stem smooth, slender. New Grenada, 1853. An elegant species.

G. procumbens (procumbent).* *l.* pendent, 2ft. to 4ft. long, pinnate; pinnæ pendent, about 1ft. long, 1in. to 2in. broad, very deep green. Stem stout. Described as one of the most beautiful palms in the whole genus.

G. pumila (dwarf).* *l.* broad, deeply cleft at the apex; petioles slender, terete. Tropical America. A pretty dwarf-growing species.

G. Schottiana (Schott's).* *l.* pinnate, 1ft. to 3ft. long; pinnæ long, tapering to a tail-like point; petioles sheathing at base, long, arching. Stem slender. Brazil, 1820.

G. undata (wavy). *l.* arching, irregularly pinnate, 2ft. to 3ft. long; pinnæ plaited, dark green, terminal pinna deeply bifid; petioles sheathing, clothed with rough fibrous tissue at base. Stem stout, 9in. to 12in. in circumference. Venezuela, 1850.

G. Verschaffeltii (Verschaffelt's). *See* **Calyptrogyne Ghiesbreghtiana.**

Other species sometimes seen in cultivation are: *princeps* and *Spixiana.*

GEORCHIS. Included under **Goodyera** (which *see*).

GEORGINA. A synonym of **Dahlia** (which *see*).

GEOTHERMOMETER. A thermometer for determining the temperature of the earth.

GERANIACEÆ. A natural order of herbs, shrubs, or sub-shrubs, rarely arborescent. Flowers often showy; sepals five, imbricate, one of them sometimes spurred; petals five, unguiculate, imbricate or valvate in bud. Leaves opposite or alternate, usually palmately veined and lobed, often stipulate. There are about twenty genera and 750 species, dispersed through the temperate and sub-tropical regions of the whole world, but especially abounding in South Africa. The species possess astringent and aromatic properties; many of them are fragrant, while others have a musky odour. The members of the tribe *Oxalideæ* abound in oxalic acid, and some have edible tubers. Well-known genera are: *Erodium*, *Geranium*, *Pelargonium*, and *Tropæolum.*

GERANIUM (*Geranion*, the old Greek name used by Dioscorides, derived from *geranos*, a crane; referring to the long beak which terminates the carpels). Crane's Bill. ORD. *Geraniaceæ.* A genus containing a hundred species of hardy herbaceous plants, rarely shrubs, dispersed through the temperate regions of the whole world. Flowers equal; sepals and petals five, imbricate in bud; stamens ten, rarely five; inflorescence cymose. Leaves opposite or alternate, stipulate, dentately or palmately (rarely pinnately) lobed or dissected. The genus is represented in Britain by eleven species, some of which are thoroughly well worth growing as ornamental border plants. One of the commonest of them, the Dove's Foot, *G. molle*, is found almost everywhere in waste places and on dry lawns. Geraniums thrive in almost any common garden soil, but prefer a well-drained one. They are excellent subjects for growing on rockwork, banks, or borders. Propagated by divisions, or by seeds.

The host of garden plants popularly known as Show, Fancy, Scarlet, Tricolor, &c., Geraniums, belong to the genus **Pelargonium** (which *see*).

G. albanum (Albanian). *fl.* purple; petals emarginate; peduncles two-flowered, elongated, hispid, May. *l.* kidney-shaped, seven-lobed; lobes trifid; lobules three-toothed. Stem flaccid, simple. *h.* 1ft. Tauria, &c., 1820. SYN. *G. cristatum.*

G. anemonæfolium (Anemone-leaved).* *fl.* purplish-red, large; peduncles two-flowered, opposite, erect, smooth. May. *l.* smooth, palmately five-cleft, with bipinnatifidly-cleft segments, upper ones three-parted. Stem suffruticose. *h.* 1ft. to 2ft. Madeira, 1778. Half-hardy shrub. See Fig. 96. (B. M. 206.)

G. argenteum (silvery).* *fl.* pale red, with darker stripes, large; petals emarginate; peduncles almost radical, two-flowered. June and July. *l.* all almost radical, on long petioles, hoary or silky on both surfaces, five to seven-parted, with trifid lobes and linear

Geranium—*continued.*

lobules. *h.* 3in. Northern Italy, 1699. An elegant alpine plant. See Fig. 97.

G. asphodeloides (Asphodel-like). *fl.* usually purplish-violet, few; petals obovate, often truncate, twice as long as the sharp-pointed downy sepals. Summer. *l.* five-lobed; lobes trifid; radical ones long-stalked, very downy. *h.* 6in. South Europe, 1828. (S. F. G. 661.)

Geranium—*continued.*

and clothed with minute adpressed hairs, paler below, cut down nearly or quite to the base into three to five divisions, with several acute, erecto-patent, irregular, deltoid or linear teeth. Stems often 1ft. or 2ft. long, and entangled, generally naked in the lower part, but clothed with short grey glandular pubescence upwards. *h.* 9in. South Africa, 1862. (Ref. B. 147.)

G. cinereum (grey).* *fl.* pale red, with dark stripes; petals

FIG. 96. GERANIUM ANEMONÆFOLIUM.

G. atlanticum (Atlantic).* *fl.* 1½in. in diameter, in terminal, two-flowered, hairy peduncles; sepals elliptic, acuminate; petals pale purple, with red veins, obcordate, three or four times as long as the sepals. June. *l.* orbicular, cut nearly to the base into five or seven narrowly obovate or cuneate, trifid or pinnatifidly laciniated, and toothed segments. Stems 1ft. to 1½ft. high. Algiers, 1878. (B. M. 6452.)

FIG. 97. GERANIUM ARGENTEUM.

G. caffrum (Caffre). *fl.* in pairs, on long slender pedicels; petals pale lilac or white, obovate, emarginate at the apex, considerably exceeding the calyx. June. *l.* 1in. to 3in. broad, full green above, emarginate; peduncles almost radical, two-flowered. June. *l.* almost radical, stalked, clothed with glaucous pubescence, five to seven-parted, with wedge-shaped trifid lobes. *h.* 6in. Pyrenees, &c. Plant almost stemless.

G. collinum (hill-loving). *fl.* purplish-violet; petals entire, roundish, hardly longer than the calyx. May. *l.* palmately five-parted, with somewhat trilobed lobes, deeply serrated; peduncles and calyces covered with clammy hairs. Stem angular, diffused, and somewhat decumbent, pubescent. Eastern Europe, &c., 1815.

G. cristatum (crested). A synonym of *G. albanum.*

G. dahuricum (Dahurian).* *fl.* purple; petals entire, much bearded at the base; peduncles two-flowered, three times longer than the leaves. June. *l.* opposite, three to five-parted, with cut, acute lobes. Stem erect, smooth, naked at the base. *h.* 1½ft. Dahuria, 1820.

G. Endressii (Endress's).* *fl.* light rose, with darker veins; petals oblong-ovate, entire, fringed at base; filaments densely hairy; peduncles axillary, two-flowered. Summer. *l.* opposite, stalked, palmate; upper ones three-lobed, lower ones five-lobed; lobes acute, serrated. *h.* 1ft. Pyrenees.

G. eriostemon (woolly-stamened). *fl.* pale violet, with white stamens, but purple towards the apex; petals entire, bearded at the base. June. *l.* five-lobed, with ovate deeply-toothed lobes; lower ones on long stalks, alternate; upper ones sessile, opposite. Stem slightly angled, forked, erect. *h.* 6in. to 3ft. Nepaul, 1822. (Sw. Ger. 197.)

G. ibericum (Iberian).* *fl.* blue, large; petals obcordate, or somewhat trifid. Summer and autumn. *l.* five to seven-parted, with pinnately-cut lobes and toothed lobules, villous, dichotomous, erect. *h.* 1ft. Iberia, 1802. A very showy plant. (B. M. 1386.)

G. i. platypetalum (broad-petaled). *fl.* deep violet, with reddish streaks; more than 1in. in diameter; petals emarginate. Summer. *l.* alternate or opposite; lobes five to seven, deeply cut, fringed. *h.* 1ft. to 2ft. Georgia. See Fig. 98.

G. Lamberti (Lambert's).* *fl.* bright lilac, large; petals large, roundish-ovate, concave and veiny; filaments beset with white hairs. Summer and autumn. *l.* opposite, cordate, five-lobed, pilose on both surfaces, soft; lobes wedge-shaped, cut, toothed. Stem diffuse, branched, elongated. Nepaul, 1824. (Sw. Ger. 338.)

G. lucidum (clear). *fl.* bright rose-coloured, small. May to

Geranium—*continued.*

August. *l.* roundish, five-lobed, shining. Stem spreading in every direction. *h.* 6in. to 12in. Europe (Britain), North Africa, Asia. Annual or biennial. (Sy. En. B. 304.)

G. macrorhizon (large-rooted).* *fl.* deep red or bright purple; petals entire, a little reflexed; calyces globose, inflated. May to July. *l.* smooth, five-parted, with the lobes toothed at the apex. Stem suffruticose at the base, dichotomous at the apex. *h.* 1ft. South Europe, 1576. (B. M. 2420.)

G. maculatum (spotted).* *fl.* pale lilac, varying in size; petals obovate, entire. Summer. *l.* three to five-parted, with deeply-toothed lobes; radical ones on long stalks; upper ones opposite, sessile. Stem rather angular, erect, dichotomous, pubescent. *h.* 1½ft. North America, 1732. (B. M. Pl. 42.)

FIG. 98. FLOWERING BRANCH OF GERANIUM IBERICUM PLATYPETALUM.

G. ornithopodum (bird's-foot). *fl.* in pairs, on densely downy, drooping, slender pedicels; petals white, and veined with red. *l.* roundish in general outline, downy principally on the lower face, palmately five-lobed, usually at least half-way down, with pinnatifid divisions. Stems densely clothed with soft, short, decurved, whitish hairs. *h.* 4ft. to 5ft. Cape Colony, 1872. A diffusely-branched half-hardy perennial herb. (Ref. B. 290.)

G. phæum (dusky).* *fl.* dark brown, almost black, with a white spot at the base of each petal; petals spreading and entire. May and June. *l.* five to nine-lobed, deeply toothed; upper ones sessile. Stem round, forked. Central and Western Europe; naturalised in Britain. (Sy. En. B. 294.)

G. pratense (meadow).* *fl.* blue, large; petals entire; peduncles somewhat corymbose. Summer. *l.* seven-parted, with sharply-pinnatifid and deeply serrated, linear lobes. Stem round, erect, downy. *h.* 2ft. to 3ft. Europe (Britain), Siberia. (Sy. En. B. 297.) There is a double-flowered form of this species, which makes an excellent border plant.

G. Robertianum. Herb-Robert. *fl.* bright crimson, small; petals entire. Summer and autumn. *l.* three to five-parted, with trifid pinnatifid lobes. *h.* 6in. to 9in. Europe (Britain), Asia, North Africa. (Sy. En. B. 305.)

G. R. alba (white). A white-flowered form, well worthy of a place on the rockery or in the herbaceous border.

G. sanguineum (bloody).* *fl.* crimson or blood-red, large, about ½in. across; petals notched; peduncles one-flowered, axillary, much longer than the petioles. Summer. *l.* opposite, five to seven-parted, with trifid lobes and linear lobules. Stems erect or

Geranium—*continued.*

diffuse, branched. *h.* 1ft. to 2ft. Europe (Britain), West Asia. A very handsome species. (Sy. En. B. 293.)

G. s. lancastriense (Lancaster). *fl.* flesh-coloured, with purple veins, large.

G. striatum (streaked).* *fl.* pink, elegantly striped with darker veins; petals emarginately two-lobed. May to October. *l.*, lower ones five-lobed, upper ones three-lobed; the lobes ovate, acute, deeply toothed. Stem round, decumbent. South Europe, 1629. (B. M. 55.)

G. sylvaticum (wood).* *fl.* purple or blue, with crimson veins; petals somewhat emarginate; peduncles rather corymbose. June and July. *l.* five to seven-lobed; lobes oblong, deeply toothed. Stem round, erect. *h.* 2ft. Europe (Britain), Siberia, West Asia. (Sy. En. B. 296.)

G. tuberosum (tuberose). *fl.* purple, large, numerous, elegant; petals bifid. May. *l.* many-parted; lobes linear, pinnatifid, serrated. Stem, from the base to the fork, naked. *h.* 9in. South Europe, &c., 1596. (Sw. Ger. 155.)

FIG. 99. GERANIUM WALLICHIANUM.

G. Wallichianum (Wallich's).* *fl.* purple, large; petals emarginate. June. *l.* five-parted, with broadly cuneate-ovate, deeply toothed lobes, clothed on both surfaces, as well as the stem, with silky hairs. Stem decumbent, purple. Temperate Himalaya, 1820. See Fig. 99. (B. M. 2377.)

GERARDIA (named in honour of John Gerard, 1545-1607, author of the famous "Herbal," 1597, and a great cultivator of exotic plants). SYN. *Virgularia.* ORD. *Scrophularineæ.* A genus containing about thirty species of annual or perennial, erect, branching herbs, natives of North and South America. Corolla rose-purple or yellow, the former colour rarely varying to white. Leaves

FIG. 100. GERARDIA QUERCIFOLIA, showing Habit and detached Flowers.

Gerardia—*continued.*

usually opposite, the uppermost reduced to bracts of the racemose or paniculate showy flowers. Considerable difficulty is experienced in the cultivation of this genus (owing to its being more or less root-parasitic); hence, it is but rarely represented in English gardens. Imported seeds frequently germinate, and the plants thrive in rich, friable soil, in a warm, sheltered situation.

G. pedicularia (Louse-wort). *fl.* citron-yellow, varying to deep yellow, sometimes assuming a reddish tint. *l.* pinnatifid, cut toothed. *h.* 2ft. to 3ft. United States. Perennial. A smaller, but more branching species than *G. quercifolia*, having smaller and less numerous flowers, about 1in. long. (G. C. 1872, p. 43.)

G. purpurea (purple). *fl.* purple; corolla 1in. or less long; pedicels shorter than the calyx, mainly opposite. July. *l.* usually spreading, narrowly linear, either somewhat scabrous or smooth, with merely scabrous margins. Branches virgate, rather spreading. *h.* 1ft. to 2ft. United States, 1772. Annual. A marked variety of this variable species, *G. p. pauvercula*, is figured in B. M. 2048, under the name of *G. purpurea*.

G. quercifolia (Oak-leaved). *fl.*, corolla yellow, nearly 2in. long, tubularly campanulate; calyx large, a little inflated. July and August. *l.*, lower ones large, bipinnatifid; upper ones oblong-lanceolate, pinnatifid or quite entire. *h.* 3ft. to 6ft. United States, 1812. Perennial. See Fig. 100.

GERMANDER. *See* **Teucrium Chamædrys.**

GERMANEA. A synonym of **Plectranthus.**

GERMAN IVY. *See* **Senecio mikanioides.**

GERMEN. The ovary.

GERMINATION. The first act of growth in the embryo plant. Its immediate causes are the presence of moisture, atmospheric air, and a certain temperature above freezing point, varying in elevation, of course, with the nature of the species. Heat excites the vitality of the embryo plant, and enables it to take advantage of the agents with which it is in contact. It has generally been considered that the seed should be excluded from direct light at first, but this has been proved to be quite unnecessary in very many cases.

GEROPOGON. Now included under **Tragopogon** (which *see*).

GESNERA (named after Conrad Gesner, of Zurich, 1516-1565, a famous botanist and natural historian). Including *Rechsteinera*. ORD. *Gesneraceæ*. A genus of about fifty species of very elegant stove perennials, mostly natives of Brazil; a few, however, are dispersed through Guiana, Columbia, and Peru, one extending to Mexico. Flowers disposed in opposite cymes, constituting a terminal thyrse; peduncles furnished with floral leaves or bracts at the base; corolla tube often elongated, sometimes distinctly ventricose, often curved and gibbous at the base; limb regular, or two-lipped. Leaves opposite. The species are mostly tuberous-rooted and herbaceous.

Cultivation. Propagation is effected by the increase of tubers; also by cuttings of the shoots, inserted in peat, soon after the plants are started, and by leaf cuttings, detached and put in when they are fully matured. The flowering season of Gesneras may be considerably prolonged by starting successional batches from March until midsummer. Thorough drainage is essential, and peat and leaf soil, with the addition of a little loam and sand, forms a good compost, which should only be pressed moderately firm in potting. The bulbs may either be grown singly, in 5in. pots, or about five arranged over one 6in. in diameter; they should be covered with 1in. of soil, and kept rather dry until growth commences, when the quantity of water may be increased, according to the amount of roots. Shade from bright sunshine, in summer, is necessary, and care must be taken to keep the leaves clean, as in many species these are extremely attractive and beautifully marked. Syringing is not recommended after the leaves are developed; the water, in nearly all cases, contains lime in solution, and, as evaporation takes place, a sediment is left and retained amongst the minute hairs on the leaves

Gesnera—*continued.*

of such plants as Gesneras, greatly to their disfigurement, when in flower. The plants succeed best on a moist bottom, such as a bed of coal ashes, in a house kept, in summer, at about 65deg. by night, and, in winter not below 55deg. When flowering is over, they should be gradually ripened and dried off, until all the foliage is dead, when water should be entirely withheld, and the pots stored, with their contents, in a dry part of the stove, where they may remain until starting time the following year. Thrips are frequently very troublesome on the young leaves, and should be carefully looked for and destroyed by fumigating, when in a young state. Sponging is sometimes practised, but the leaves are very brittle, and easily broken. If it can be avoided, the plants should not be placed in any house where these insects, or other pests, are present.

G. aggregata (aggregated). *fl.* scarlet; corolla clavate, cylindrical; peduncles axillary, one-flowered, aggregate. August. *l.* opposite, oblong-ovate, crenate. Branches rounded. *h.* 2ft. Brazil, 1816. (B. M. 2725; B. R. 329.)

G. bulbosa (bulbous). *fl.* scarlet; cymes many-flowered, spreading from the axils of the leaves, and disposed upwards in a terminal thyrse. Summer. *l.* opposite, broad-ovate, cordate, serrate. Stem erect. *h.* 2ft. Brazil, 1816. Plant villous. (B. M. 3041.)

G. chromatella (yellow). *fl.* rich yellow, drooping, in elegant erect spikes. Summer. *l.* rich dark velvety. Garden variety.

G. cinnabarina. *See* **Nægelia cinnabarina.**

G. cochlearis (spoon-leaved). *fl.* scarlet, in simple racemes; tube of corolla long, inflated beneath; limb five-lobed; pedicels elongated. June to August. *l.* opposite, on long petioles, cordate-ovate, concave, tomentose, rugose. *h.* 1ft. Brazil, 1837. (B. M. 3787.)

G. Cooperi (Cooper's).* *fl.* bright scarlet, with a densely spotted throat, drooping. May. *l.* light green. *h.* 2ft. Brazil, 1829.

G. discolor (two-coloured). *fl.* scarlet, pendulous; corolla glabrous, clavately cylindrical; pedicels elongated, slender, aggregate. June to September. *l.* large, opposite, petiolate,

FIG. 101. FLOWERING BRANCH OF GESNERA ELLIPTICA LUTEA.

Gesnera—*continued.*

cordate-ovate, crenated, downy. *h.* 2ft. Brazil, 1839. (B. R. 1851, 63.)

G. Donkelaariana (Donkelar's).* *fl.* bright vermilion, about 2in. long, freely produced in terminal heads. June. *l.* nearly cordate, about 8in. across, green, tinged with purple and red. *h.* 1ft. to 2ft. Columbia. (B. M. 5070.)

G. elliptica lutea (elliptic, yellow-flowered). *fl.*, corolla yellow; limb obliquely bilabiate; peduncles terminal, racemose and axillary, solitary. May. *l.* opposite, elliptic, wrinkled, serrate; lower ones petiolate, upper ones sessile. *h.* 1ft. Santa Martha, 1844. See Fig. 101. (B. M. 4242.)

G. exoniensis (Exeter).* *fl.* deep orange-scarlet, with a yellow throat, numerously produced in closely-set masses, about 1ft. through. Winter. *l.* dark rich velvety, covered with minute red hairs. Garden hybrid.

G. glaucophylla (glaucous-leaved). *fl.* deep orange-red; throat light, spotted with orange. Summer. *l.* glaucous, prettily mottled, covered with red hairs.

G. Hondensis (Honda). *fl.* yellowish-red, hairy, ventricose at top; peduncles axillary, one-flowered, by twos and threes. May. *l.* opposite, somewhat obliquely ovate-oblong, crenulated, woolly beneath. *h.* 1ft. Brazil, 1845. (B. M. 4217.)

FIG. 102. GESNERA REFULGENS.

G. Lindleyana (Lindley's). *fl.* freely produced; upper part of tube rosy-pink; lower part and limb yellow, freckled with red. July. *l.* broadly ovate, rich deep velvety-green and red. Brazil, 1825.

G. Marchii (March's). A synonym of *G. pendulina*

G. nægelioides (Nægelia-like).* *fl.* bright rosy-pink, marbled with red, large, tubular; throat yellow, dotted with red. Summer. *l.* cordate-ovate, deep green, hairy on the margins and roughly toothed. An elegant garden hybrid, with numerous varieties, of which the following are a selection:

G. n. aureo-roseum (golden-rose). *fl.* bright rosy-lilac; upper portions of the limb plain rose-colour, lower part beautifully spotted with carmine; throat marked with orange-yellow. *l.* ovate-acuminate.

G. n. bicolor (two-coloured). *fl.*, upper half rosy-red, lower orange-yellow; limb and throat orange-yellow, profusely spotted with red. *l.* ovate-lanceolate, serrated, purplish-red on the under side, bluish metallic-green on the upper.

G. n. candida (white). *fl.* pure white, marked with pale yellow in the throat, tubular; produced in great profusion. *l.* broadly-ovate, toothed, deep green. Stems erect, branching.

G. n. corallina (coral-red). *fl.* rich deep red, almost maroon; throat orange-yellow, profusely spotted with red. *l.* deep green, coarsely toothed. Stems red.

G. n. lilacinella (lilac). *fl.* delicate lilac-colour, beautifully marbled with a deeper tint of the same colour; throat lemon-colour; produced in profusion upon the numerous laterals, and

Gesnera—*continued.*

from the base of the leaves upon the main stem, upon long foot-stalks. *l.* large, cordate, coarsely toothed, deep bright green above, paler and woolly below.

G. n. scintillans (glistening). *fl.*, outside deep plum-colour; limb rosy-red; throat orange-yellow, streaked and dotted crimson, about 2in. long in the tube, and nearly as much across the limb; produced in large lateral heads towards the tops of the shoots. *l.* somewhat oblong, serrated, bright green above, pale below, tinged with red.

G. nigrescens (blackish). *fl.*, tubes dark red; throat light orange, spotted. *l.* large, dark velvety. Garden hybrid.

G. pendulina (pendulous). *fl.* scarlet, numerous, in whorls; corolla drooping, cylindrical, gibbous at top; limb five-lobed. August. *l.* three in a whorl, petiolate, ovate, crenate. *h.* 3ft. Mexico, 1844. SYN. *G. Marchii* (under which name it is figured in B. M. 3744).

G. purpurea (purple). *fl.* purple; panicle sub-verticillate; corolla with a long tube; upper lip straight, two-lobed. June to September. *l.* whorled, cordate-oblong, toothed, downy. *h.* 2ft. Brazil, 1849.

G. pyramidalis (pyramidal).* *fl.* deep orange-red; throat and lip light orange, spotted. Winter. *l.* 7in. broad, nearly round, with a dark velvety ground. Garden hybrid.

G. refulgens (refulgent). *fl.* rich deep red. Summer. *l.* cordate-ovate, clothed with short blood-coloured hairs. *h.* 1ft. to 1½ft. A beautiful plant, of garden origin. See Fig. 102.

G. tuberosa (tuberous-rooted). *fl.* scarlet; peduncles from base of rhizome. August. *l.* broad-ovate, toothed, cordate at base, downy. Stem on horizontal rhizome. *h.* 6in. Brazil, 1834. (B. M. 3664.)

G. zebrina. *See* **Nægelia zebrina.**

GESNERACEÆ. A natural order of herbs or shrubs, rarely trees, often growing from scaly tubers. Flowers showy; corolla variously coloured, often scarlet, violet, or blue, rarely white; calyx half adhering, five-parted; stamens two or four. Leaves opposite; usually wrinkled. There are about seventy-one genera and 700 species, natives of various parts of the world, chiefly the warmer regions of America. Sometimes the name *Cyrtandraceæ* is given to this order. Illustrative genera are: *Achimenes*, *Besleria*, *Cyrtandra*, *Gesnera*, *Gloxinia*, and *Streptocarpus*.

GESNERIA. *See* **Pentarhaphia.**

GETHYLLIS (an old Greek name, a diminutive of *gethuon*, a leek). ORD. *Amaryllideæ*. A genus of four or five species of pretty dwarf greenhouse bulbous perennials, from the Cape of Good Hope, allied to *Sternbergia*. Flowers white, deliciously fragrant; perianth tube long, cylindrical; limb of six segments, regular and spreading; scapes short, one-flowered. Leaves linear. The plants thrive best in a mixture of sandy loam and peat; they may be increased by offsets, or by seeds. But few of the species have been introduced.

G. ciliaris (fringed). *fl.* white; sepals ovate-oblong. June and July. *l.* linear, spiral, ciliated. *h.* 6in. 1788.

G. lanceolata (lance-shaped). *fl.* white; sepals lanceolate. June. *l.* lanceolate, flat. *h.* 9in. 1790.

G. spiralis (spiral). *fl.* white; sepals ovate-oblong. June and July. *l.* linear, spiral, smooth. *h.* 9in. 1780. (B. M. 1088.)

G. villosa (hairy). *fl.* white; sepals ovate-oblong. June and July. *l.* linear, filiform, spiral, villous. *h.* 9in. 1787.

GEUM (the old Latin name used by Pliny). Avens. Including *Sieversia*. Some of the species were formerly placed under a genus named *Adamsia*. ORD. *Rosaceæ*. A genus comprising about thirty species of hardy perennial herbs, widely diffused over all temperate and cold regions. Flowers yellow, red, or white, growing singly on long peduncles, at the ends of the stems or branches; petals five. Leaves variously dissected, the terminal lobe always the largest. Geums are of very easy culture, in moderately good soil, and in a well-drained situation. Most of the species are well adapted for growing in borders and in the rock garden. Propagated by seeds, or by division.

G. chiloense (Chiloe). *fl.* scarlet, sometimes copper-coloured, panicled, erect. Summer. *l.*, radical ones interruptedly pinnate; leaflets crenately serrated, the terminal one large, cordate, lobed, and crenated; cauline ones three-parted, deeply cut. Stem glandular. *h.* 1ft. to 2ft. Chiloe, 1826. Plant villous. (B. R. 1088, under name of *G. coccineum.*)

Geum—*continued.*

G. c. flore-pleno (double-flowered) is a very handsome form, with double flowers of a bright dazzling scarlet.

G. coccineum (scarlet).* *fl.* terminal, pedunculate, erect; calyx segments depressed, pubescent; petals purplish, orbiculate-reniform, clawed. *l.* green, inciso-crenate, veined, pilose; radical ones tufted, spreading, large, lyrate-pinnatifid, leaflets five or seven; upper cauline leaves simple, three-lobed, toothed. Stem solitary, herbaceous, erect; apex sub-corymbose, few-flowered. *h.* 6in. to 15in. Greece, Asia Minor, &c. (S. F. G. 485.)

G. elatum (tall).* *fl.* erect; petals golden-yellow, orbicular, sometimes notched or two-lobed; calyx lobes ovate-deltoid, or lanceolate, entire or toothed; peduncles long, slender. July. *l.*, radical ones sub-sessile, narrow, gradually dilated from the base to the rounded tip, pinnatisect; cauline ones small, with larger adnate-cut stipules. Stem very slender, twice or more forked, rarely simple. Himalaya Mountains, 1880. Hardy. (B. M. 6568.)

G. japonicum (Japanese). *fl.* yellow, erect. Summer. *l.* three to five-lobed, hairy. Stem flexuous, hairy. *h.* 1ft. to 2ft. Japan.

FIG. 103. GEUM MONTANUM, showing Habit and detached Single Flower.

G. montanum (mountain).* *fl.* yellow, erect. Spring. *l.* softly hairy, irregularly incised. *h.* 6in. to 12in. Europe. See Fig. 103.

G. pyrenaicum (Pyrenean).* *fl.* yellow, nodding; stems one to four-flowered. June. *l.* interruptedly pinnate; lower leaflets ovate, dentate, small. Stems erect, simple. *h.* 1½ft. Pyrenees, 1804. Plant pilose.

G. rivale (brook-loving).* Water Avens. *fl.* reddish, nodding; peduncles pilose, elongated; stems one to four-flowered. June. *l.* interruptedly and lyrately pinnate; leaflets obovate, biserrate; cauline leaves three-lobed. Stems erect, simple. *h.* 1ft. to 3ft. Cold and temperate regions (Britain).

G. strictum (upright). *fl.* yellow and striped, large, ascending. May to July. *l.* all interruptedly pinnate; leaflets ovate, toothed. *h.* 2ft. Europe, North America, 1778. Plant hairy.

G. triflorum (three-flowered).* *fl.*, calyx dark purple; petals white, purplish-red at extremity and margins, oblong, never spreading; scape purplish, 8in. to 12in. high, hairy, terminating in a three-flowered umbel; pedicels 3in. to 4in. long. July. *l.* radical, 4in. to 6in. (or more) long, oblong or obovate in outline, interruptedly pinnate; margins of pinnæ deeply serrated. North America. (B. M. 2858, under name of *Sieversia triflora.*)

GHERKIN. A small-fruited variety of *Cucumis sativa.*

GHOST MOTH, or **GHOST SWIFT.** *See* **Otter Moth.**

GIANT FENNEL. *See* **Ferula.**

GIBBOUS. Protuberant; more convex or tumid in one place than another.

GILIA (named in honour of P. S. Gilio, a Spanish botanist of the eighteenth century). Including *Fenzlia*, *Ipomopsis*, *Leptodactylon*, and *Leptosiphon.* ORD. *Polemoniaceæ.* A genus containing about sixty-five species of, for the most part, hardy annual herbs, natives of North-west, extra-tropical, and sub-tropical South America. Corolla

Gilia—*continued.*

infundibuliform and hypocrateriform, sometimes almost campanulate or rotate. Leaves variable. Gilias form very attractive subjects for beds or edgings, where they succeed without causing blanks by part of the plants dying away. They are readily raised from seed, sown in the open ground, in March or April. A rather light soil should be chosen, and positions selected according to the heights of different species.

G. achilleæfolia (Milfoil-leaved).* *fl.* purplish-blue; corymbs capitate, many-flowered, on very long peduncles. August. *l.* twice or thrice pinnate; leaflets linear-subulate. *h.* 1ft. California, 1833. (B. M. 5939.) There is an elegant variety with white flowers, and another with red ones.

FIG. 104. GILIA ANDROSACEA.

G. androsacea (Androsace-like).* *fl.*, corolla lilac, pink, or nearly white, with yellow or dark throat. August. *l.* opposite, narrow, palmatisect. *h.* 9in. to 12in. California. See Fig. 104. SYN. *Leptosiphon androsaceus* (under which name it is figured in B. M. 3491, B. R. 1710). There is a variety, *rosacea*, having a rose-red corolla, varying, however, into other hues. San Francisco. (B. M. 5863, under name of *Leptosiphon parviflorus rosaceus.*)

G. Brandegei (Brandegee's).* *fl.* several, in a short, racemose, leafy thyrse; corolla golden-yellow, trumpet-shaped; lobes oval and short. *l.* all pinnate, elongated-linear in circumscription; leaflets small, numerous. Stem simple. *h.* 9in. to 12in. Colorado, 1878. Perennial. (B. M. 6378.)

G. capitata (headed).* *fl.* blue, sessile, disposed in dense heads on long peduncles. Summer. *l.* bipinnatifid; segments linear, cut. *h.* 1ft. to 2ft. North-west America, 1826. (B. M. 2698.)

G. densiflora (dense-flowered).* *fl.*, corolla tube lilac or nearly white, little (if at all) exserted beyond the calyx. June. *l.*, divisions filiform, somewhat rigid. California. SYN. *Leptosiphon densiflorus* (under which name it is figured in B. M. 3578; B. R. 1725).

G. dianthoides (Pink-like). *fl.* varying greatly in size and colour; corolla lilac or purplish, usually with darker or yellowish throat. July. *l.* narrow-linear. *h.* 2in. to 5in. California, 1855. A showy little plant. (B. M. 4876.)

G. inconspicua (inconspicuous). *fl.* somewhat crowded and sub-sessile, or at length loosely panicled; corolla violet or purplish, narrowly funnel-shaped, with proper tube shorter or slightly longer than the calyx. August. *l.* mostly pinnatifid or pinnately parted, or the lowest bipinnatifid, with short mucronate cuspidate lobes. *h.* 9in. to 12in. North America. (B. M. 2883.)

G. laciniata (cut-leaved). *fl.* purplish; peduncles axillary, solitary, one to three-flowered. July. *l.* pinnatifid; segments narrow-oblong, sinuated. *h.* 6in. to 12in. Chili, 1831.

G. liniflora (Flax-flowered).* *fl.* white, solitary, on long peduncles. Summer. *l.*, lower ones opposite, all sessile and palmately cut. *h.* 1ft. California, 1833. (B. M. 5895.)

G. micrantha (small-flowered).* *fl.* rosy-coloured, produced in great abundance, with a slender tube about 1¼in. long. Summer. *l.* five to seven-parted; segments linear, acute. *h.* 9in. Plant more or less clothed with longish weak hairs. California, 1870. SYN. *Leptosiphon roseus.* There is a form, *aurea*, with golden-yellow flowers.

Gilia—*continued.*

G. multicaulis (many-stemmed). *fl.* blue; corymbs three to ten-flowered, on very long peduncles, scarcely panicled. Summer. *l.* somewhat bipinnate, smoothish; segments linear. *h.* 1ft. California, 1833. (B. M. 3440, and B. R. 1682, under name of *G. achilleæfolia.*)

G. tricolor (three-coloured).* *fl.*, corolla with an orange-yellow tube and centre, and the light purple or white of the margin separated by a circle of deep purple; corymbs three to six-flowered; panicles rather dense. June. *l.* bipinnate; segments linear-subulate. *h.* 1ft. California, 1833. (B. M. 3463; B. R. 1704.) There are several pretty varieties of this species, including white and violet-coloured ones.

GILIBERTIA (named after J. E. Gilibert, 1741-1814, a French botanist and physician). ORD. *Araliaceæ.* A genus comprising two or three species of ornamental evergreen shrubs, natives of tropical America. Flowers in terminal compound umbels. Leaves simple, entire. The species described below is, perhaps, the only one yet in cultivation. It thrives in a compost of sand, leaf mould, and light loam. Increased readily by cuttings, inserted in sand, in a gentle heat.

G. brasiliensis (Brazilian). *fl.* greenish. February and March. *l.* leathery, dark green. *h.* 4ft. to 6ft.

GILLENIA (named after Arnoldus Gillenius, a botanist of the seventeenth century). ORD. *Rosaceæ.* A genus comprising two species of hardy perennial herbs, natives of Northern United States. Flowers axillary and terminal, on very long peduncles. Leaves sub-sessile, trifoliolate; leaflets stalked, serrated. Gillenias are of easy culture, in a rather moist peaty soil, with partial shade. Increased readily by dividing the roots, in spring.

G. stipulacea (stipulaceous). *fl.* white. June. *l.* lanceolate, deeply incised. *h.* 1ft. to 2ft.

FIG. 105. GILLENIA TRIFOLIATA, showing Habit and detached Single Flower.

G. trifoliata (three-leaved).* *fl.* red to white, in panicles; calyx persistent, becoming red after the petals have fallen. June. *l.*, stipules linear, acuminated, entire. *h.* 1½ft. 1713. See Fig. 105 (B. M. 489, under name of *Spiræa trifoliata.*)

GILLIESIA (named in honour of Dr. Gillies, of Mendoza, in Chili). ORD. *Liliaceæ.* A genus comprising three species of bulbous herbs, natives of Chili. Flowers greenish, in terminal umbels; scape simple, leafless. Leaves few, radical, linear. *G. graminea*, the species best known to cultivation, thrives in a loam and peat soil, in a warm border; it requires a little protection in winter. Propagated by offsets.

G. graminea (grass-like). *fl.* green, inconspicuous, drooping; umbels divaricate, few-flowered; spathe two-valved, green, erect, persistent; scapes weak, terete, decumbent. September. *l.* radical, linear, channelled. *h.* 1ft. Valparaiso, 1825. (B. R. 992.)

GILLIFLOWER. A name corrupted from the French Giroflée; it is also written Gillyflower and Gilloflower. "The name was originally given, in Italy, to plants of the Pink tribe, especially the Carnation, but has of late years, in England, been transferred to several cruciferous plants. That of Chaucer, Spencer, and Shakespeare was, as in Italy, *Dianthus Caryophyllus;* that of later writers and gardeners, *Matthiola* and *Cheiranthus*" (Britten and Holland, "Dictionary of English Plant Names").

GINGER. The Ginger of commerce is the dried rhizomes of **Zingiber officinale** (which *see*). It is imported into this country in its dried and bleached state, from both the East and West Indies, Africa, and China; but Jamaica Ginger is considered the best. It is used both as a condiment and as a preserve.

GINGERBREAD PALM. *See* **Hyphæne thebaica.**

GINGERBREAD PLUM. *See* **Parinarium macrophyllum.**

GINGERWORTS. A popular name for the *Zingiberaceæ.*

GINKGO (the Japanese name). Maidenhair-tree. SYNS. *Salisburia, Pterophyllus.* ORD. *Coniferæ.* A monotypic genus, the species being a fine deciduous tree. It thrives thoroughly well in almost any garden soil in the South of England, but in the North requires the shelter of a wall. In some parts of France, it fruits freely. Propagated by imported seeds.

G. biloba (two-lobed).* *fl.* diœcious; male catkins slender, stalked; females in pairs, or solitary, on long footstalks. Spring. *fr.* edible, sweet, not produced until the tree has attained some size. *l.* three to five, handsome, fan-shaped, cloven about half-way from their summit, irregularly notched, thickened at the margin, smooth, striated on each side with numerous parallel nerves. Branches verticillate. *h.* 60ft. to 80ft. Northern China, 1754. (W. D. B. 168.) There are several forms of this handsome and interesting tree in the nurseries: *laciniata* has the leaves more deeply cut than usual; *pendula* is of weeping habit; and *variegata* has variegated foliage, but the colouring is not very marked.

GINSENG. The root of one or two species of *Panax.*

GIPSY MOTH (*Liparis dispar*). The specific name of this insect is derived from the fact that there is great

FIG. 106. MALE GIPSY MOTH.

disparity in the sexes. The male (Fig. 106) is dark brown or smoky, with zigzag darker markings and lighter shades;

FIG. 107. FEMALE GIPSY MOTH.

the antennæ are like feathers. The female (Fig. 107) is larger than the male; the wings are dingy or yellowish-white, with darker markings, as in the male, and a distinct black mark ❮ near the centre of the fore wing; the antennæ are simple. In both sexes the fringes are pale, with dark

Gipsy Moth—*continued.*

interspersions at the end of the wing-rays. The caterpillar is black, with yellowish marking, and a grey line down the back. Each segment has six tubercles, all emitting bristly hairs, black on the back and brown on the sides. It is believed that the Gipsy Moth is almost, if not quite, extinct as a British species; but, upon the Continent, the larvæ occasionally do considerable damage to fruit-trees by stripping them of their leaves. They may be collected by beating the branches over an inverted umbrella.

GITHAGO. Included under **Lychnis** (which *see*).

GLABROUS. Smooth; destitute of hairs.

GLADIATE. Sword-shaped; the same as Ensiform.

GLADIOLUS (diminutive of *gladius*, a sword; referring to the shape of the leaves). Corn Flag. ORD. *Irideæ*. This genus contains about ninety species of so-called "bulbous" plants, many of which are amongst the most popular of outdoor summer and autumn-flowering subjects. The geographical distribution is Central Europe, the Mediterranean region, West Asia and Africa — the headquarters of the genus being South Africa. The flowers are secund, spiked, borne on tall scapes, the colours being very varied; the perianth is sub-bilabiate, with a short curved tube. The leaves are all equitant and sword-shaped; and the corms have netted fibrous coats. Original species have long since been superseded by the very numerous and beautiful hybrids that are in cultivation. Many of the former are, however, very ornamental, and well worthy of retaining for pot culture in cool houses, or for mixed flower borders, in summer. Improvement in the Gladiolus is wholly due to the efforts of hybridisers, who took it in hand, first in France, some fifty years ago, and afterwards in this country, about the middle of the present century. Varieties that were subsequently, and those which are still annually, obtained, represent an extreme diversity in the colouring of the flowers. Some are pure white, others range from that colour to deep crimson, and include yellowish and purple shades, many being beautifully flaked and marked. Gladioli are propagated by seeds, which ripen and germinate pretty freely; and by numerous large and small bulbils, usually termed "spawn," that are found round the old corms, or on the ends of the

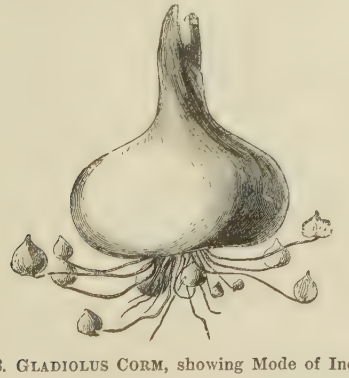


FIG. 108. GLADIOLUS CORM, showing Mode of Increase.

roots, in autumn (see Fig. 108). Seeds should be sown early in March, preferably in large pans or pots, where the young plants may be thinned and allowed to remain for the first season. The pans should first be placed in heat, and, as the seedlings appear, a light position and more air should be given, in order to gradually harden off for placing outside all the summer. If well attended to when growing, and afterwards thoroughly ripened in autumn, the young corms may be stored like larger ones, and many of them will flower the second

Gladiolus—*continued.*

year. For increasing stock of any one or more varieties, the small corms should be separated from those intended for flowering, and planted from 4in. to 6in. apart, in a warm border, about the middle of March. If watered, and allowed to grow for the summer, many of them will become large enough to flower the following year.

Cultivation. A deep rich soil, and a sheltered, sunny position, are requisite for attaining the best results. Plenty of manure may be intermixed with the soil, in the autumn, when trenching and other preparations for Gladioli should be commenced; but none should be applied in a fresh state at planting time, as it tends to cause decay in the corms, if coming in contact with them before growth commences. *Brenchleyensis* is an old sort, but still one of the best and most extensively grown. It increases rapidly and is of a good constitution, succeeding with telling effect when planted either in a bed or in small groups of about half-a-dozen, in various parts of mixed flower borders or shrubberies. If the planting of a portion is commenced early in March, and continued at intervals till the end of May, the flowering period may be similarly prolonged until late in the autumn. The corms should be inserted about 3in. deep, and 1ft. apart, if in beds; and a circular group may consist of four or five, in a space of 1ft. diameter. Each plant will require a stake before the flowering season arrives, to prevent injury from rough winds. In hot weather, plenty of water must be given, and a mulching of short manure is always beneficial as a preventative of undue evaporation. Before the appearance of severe frost, the corms should be lifted, with their tops intact, and laid in a cool, dry shed, to become ripened, when the tops may be cut off close down, and the corms placed in paper bags, until planting time. This specially refers to the South African species, and to all the finer hybrids; except in very dry sandy soils, it would be unwise to leave the corms of these in the ground throughout the winter. The South European species do not need any such attention. The large and small ones are best separated when storing; and the bags should be labelled according to the size or the variety contained in each.

Culture in Pots. Large-flowering Gladioli succeed in pots, if desired for summer or autumn decoration of greenhouses, &c. One large corm is sufficient for a 7in. pot, and successional batches may be inserted in rich soil, and grown in a frame where plenty of air can be admitted, or in a sheltered position outside. *G. Colvillei* and its white form, known as "The Bride," are amongst the most beautiful for pot culture. They succeed admirably, and may be had in full beauty in April and May, if gently forced. The corms are small, and do not require much root space. About five of them should be placed in a 5in. or 6in. pot, in autumn, and either covered for a time with ashes outside, as ordinary bulbs are, or placed in a cold frame from the first. When roots are formed, and growth begins, a few pots at a time should be successionally placed in a temperature of about 55deg. Each strong corm will produce two or more flower scapes, and, when these appear, a little higher temperature may be given, always selecting a situation exposed to light, and applying plenty of water to the roots. Later batches come on all right in a cold frame. *G. Colvillei* and *G. C. alba* succeed equally well with the larger-flowered varieties, when planted outside in summer. Any Gladiolus flowers expand well in water when they are far enough advanced to begin opening naturally. With a system specially adopted by exhibitors, the whole of the flowers in a spike are secured at one time by placing the latter in water at a certain stage, and encouraging the flowers to expand slowly in a cool place.

Gladiolus—*continued.*

Except where otherwise stated, the species enumerated below are natives of the Cape of Good Hope.

G. blandus (fair).* *fl.* white, with red markings, large; tube yellow, shorter than the spathe. June. *l.* ensiform, nerved. Stem 6in. to 2ft. high, three to ten-flowered. 1774. (B. M. 625.)

G. b. campanulatus (bell-shaped). A large and strong variety, with whitish-purple flowers. (B. M. 645.)

G. brachyandrus (short-stamened).* *fl.*, perianth bright pale scarlet, 2in. to 2½in. long; tube ½in. long; segments oblong, acute; spike nearly 1ft. long, eight to ten-flowered. July. *l.* four or five, near the base of the stem, strongly ribbed and margined, not more than 3in. long, about ½in. broad. *h.* 2ft. Tropical Africa, 1879. (B. M. 6463.)

G. byzantinus (Byzantine).* *fl.* red; corolla adscendent, nodding; spikes many-flowered. June. *l.* narrow, deep green. *h.* 2ft. Turkey, 1629. (B. M. 874.)

FIG. 109. GLADIOLUS CARDINALIS, showing Habit and detached Single Flower.

G. cardinalis (cardinal).* *fl.* fine scarlet; corolla with large white rhomboidal spots, erect; limb campanulate. July and August. *l.* ensiform, many-nerved. Stem 3ft. to 4ft. high. 1789. See Fig. 109. (B. M. 135.)

G. Colvillei (Colville's).* *fl.*, perianth tubular; limb bright red, with pale purple markings, spreading. July. *l.* linearly-ensiform, acute, strongly nerved in the middle on both sides. Stem slightly flexuose, 1½ft. high, leafy, slightly angular, glaucous. A garden hybrid between *G. cardinalis* and *G. tristis*. (S. B. F. G. 155.)

G. C. alba (white) is a charming white-flowered form; it is very largely cultivated for decorative purposes by some of the plant growers—who supply Covent Garden—under the name of The Bride.

G. communis (common). *fl.* bright rose, sometimes white; tube short; upper segments approaching, larger than the lower ones, the three internal ones almost equal; spike unilateral, six to eight-flowered. Summer. *h.* 1½ft. to 2ft. South Europe, 1596. (B. M. 86 and 1575.)

G. Cooperi (Cooper's). *fl.*, perianth tube yellowish-green, funnel-shaped; limb yellow, closely lined with purplish-red; expanded spike 1ft. long, eight to twelve-flowered. September. *l.* radical, about six, erect, ensiform, glabrous, acuminate, 1ft. to 1½ft. long, 1in. broad, strongly ribbed. *h.* 2ft. 1862. (B. M. 6202.)

G. cruentus (bloody).* *fl.* brilliant scarlet, yellow-white and speckled with red at base of limb, broadly campanulate, 4in. in diameter; two lower lateral segments of perianth marked with white; spike 6in. to 10in. long, dense-flowered. September. *l.* 1ft. to 1½ft. long, linear-ensiform. *h.* 2ft. to 3ft. Natal, 1868. (B. M. 5810.)

G. cuspidatus (abruptly-pointed).* *fl.* varying much in colour, usually beautifully marked with purple and red in the lower segments; tube filiform, straight. May and June. *l.* ensiform, generally shorter than the stem. Stem 2ft. to 3ft. high. 1795. A magnificent plant. (B. M. 582.)

G. c. ventricosus (swelling). A variety with reddish flowers, which are not so upright, and with a shorter tube and less inflated spathe than the type. May and June. (B. M. 591, under name of *G. carneus*.)

G. dracocephalus (dragon's head). *fl.*, perianth yellowish, closely striated with dull red-purple, about 2in. long and broad; lower segments bright green, spotted purple; spikes erect, five to seven-flowered. August. *l.* 6in. to 12in. long, 1in. to 1½in. broad, pale green. Stem 16in. to 18in. high, stout, terete. 1871. (B. M. 5884.)

G. floribundus (bundle-flowered).* *fl.* four to six, large and upright; limb segments varying from dirty-white with a broad livid purple longitudinal fillet, to bright flesh-colour with a lively red fillet; anthers dark violet. May. *l.* strongly and many-nerved. Stem about 1ft. high, flower-bearing nearly to its base. 1788. (B. M. 610.)

FIG. 110. HYBRIDS FROM GLADIOLUS GANDAVENSIS.

G. gandavensis (Ghent). *fl.* rich crimson, marked with yellow. Summer. According to Van Houtte, this is a hybrid between *G. psittacinus* and *G. cardinalis*; whilst Herbert believes it to have originated between *G. psittacinus* and *G. oppositiflorus*. SYN. *G. gandiensis*. See Fig. 110. (P. M. B. xi., p. 27.)

G. gandiensis (Ghent). A synonym of *G. gandavensis*.

G. gracilis (slender). *fl.* white, variable, similar to those of *G. recurvus*. March and April. *l.* thick and flat, with a deep square groove on both sides. Stem 1ft. to 3ft. high. 1800. (B. M. 562.)

G. grandis (large). *fl.* reddish-brown to whitish; segments of flower longer than the throat. May and June. *l.* linear-ensiform, three-ribbed on each side. *h.* 1½ft. 1794. (B. M. 1042, under name of *G. versicolor*.)

G. hastatus (halbert-shaped). *fl.*, perianth pinkish-white, reddish on the outside, 2½in. high. April and May. *l.* radical. *h.* 1ft. 1816. This species is nearly allied to *G. blandus*. (B. M. 1564.)

G. Papilio (butterfly-flowered).* *fl.* very pale purple, marked with rich dark purple and golden-yellow; spike slender, 1ft. or more long. *l.* narrow-ensiform, 2ft. to 3ft. long; apex acuminate. *h.* 3ft. 1866. (B. M. 5565.)

G. plicatus (folded). A synonym of *Babiana stricta sulphurea*.

FIG. 111. GLADIOLUS PSITTACINUS, showing Habit and detached Single Flower.

G. psittacinus (parrot-like).* *fl.*, corolla tube greenish, with purple streaks; limb campanulate, spreading, rich scarlet (in bud purplish-blood colour), lined and spotted with yellow; spikes 1ft. or more long, ten to twelve-flowered. Summer and autumn. *l.* distichous; lower ones 1ft. or more long. Stem 3ft. high. South-eastern Africa, &c. See Fig. 111. (B. M. 3032.)

G. pudibundus (modest). *fl.* brilliant rose, large, about ten in number, in a distichous spike; spathes two-valved; anthers purple. *l.* broadly ensiform, acuminate, ribbed, pale green. Stem 2ft. to 3ft. high. A garden hybrid between *G. blandus* and *G. cardinalis*. (S. B. F. G. ser. ii. 176.)

G. purpureo-auratus (purple-and-golden).* *fl.* almost bifarious; perianth limb golden-yellow, with a large purple blotch on the two lower segments. August. *l.* 6in. to 9in. long, ¾in. broad, acuminate, erect. *h.* 3ft. to 4ft. 1872. (B. M. 5944.)

Gladiolus—*continued.*

G. Quartinianus (Quartin Dillon's). *fl.* yellow, flushed and spotted with scarlet; spathes herbaceous, lanceolate, about 2in. long; spike about six-flowered. August. *l.* linear-ensiform, 1ft. or more long, rigid, prominently nerved. *h.* 3ft. to 4ft. Tropical Africa, 1883. (B. M. 6739.)

G. recurvus (recurved). *fl.* yellow, thickly dotted with blue, which colour eventually predominates, violet-scented; spathes about half the length of the corolla, much longer than the tube. April and May. *l.* three, outer one nearly the height of the stem. Stem 1ft. to 3ft. high, slender, erect. Root sheath white, mottled with purplish-brown. 1758. The flowers of this species are the most exquisitely scented of the whole genus. (B. M. 578.)

G. sambucinus (Elder-scented). A synonym of *Babiana sambucina.*

G. Saundersii (Saunders').* *fl.* crimson, spotted with white, six to twelve, rather remote; perianth 3in. to 3½in. in diameter; anthers yellow. Autumn. *l.* 2ft. to 3ft. long, ½in. to ¾in. broad, strongly nerved. *h.* 2ft. to 3ft. 1871. (B. M. 5873.)

G. segetum (cornfield). *fl.* rose-coloured, in two rows; lower segments unequal, each with a long, narrow white spot. *h.* 2ft. South Europe, 1596. (B. M. 719.)

G. sericeo-villosus (shaggy-stemmed). *fl.* a very peculiar yellow-green, tinged with pale yellowish-brown; spikes many-flowered; corolla limb tinged with red, campanulate; spathes shaggy. June. *l.* linear-ensiform, striped. Stem with shaggy-silky clothing. *h.* 3ft. to 4ft. 1864. (B. M. 5427.)

G. sulphureus (sulphur). A synonym of *Babiana stricta sulphurea.*

G. tristis (sad). *fl.* cernuous, 2in. to 3in. deep; corolla tube funnel-shaped, rather shorter than the divisions, the ground-work yellow, the three upper segments minutely spotted all over, both externally and internally, with small reddish-brown dots, the three lower ones narrower and spotted only on the outer half. July. *l.* with long cylindrical spathes below, almost tetragonal. *h.* 1ft. Natal, 1745. (B. M. 1098; Ref. B. 23.)

G. vittatus (striped). *fl.* pink, with darker stripes; anthers purple; corolla erect, funnel-shaped. May. *l.* ensiform. Stem 8in. to 12in. high, simple or branched. 1760. (B. M. 538, under name of *G. undulatus var.*)

Varieties. Named collections are expensive, and not largely grown, unless they are required for exhibition. The subjoined list includes a selection of new and older varieties, of varied colours, that are amongst the best for this purpose, although it contains only a few compared with the large number offered for sale by nurserymen. Seedlings are now very good, if obtained from a reliable source, and answer for purposes of decoration almost equally as well as named ones, excepting the well-known *Brenchleyensis* and *gandavensis* varieties, from which the majority of those in cultivation have descended, and which are now tolerably cheap, and well worth growing on an extensive scale.

AGDESTES, white, violet blotch on lower petal, large, handsome; AGNES MARY, white, shaded pale lilac, purplish mark on lower petal; ANNA, cherry, striped carmine, white ground; ASTRÆA, scarlet-crimson, with pale rose stripe, white centre; BRENCHLEYENSIS, vermilion-scarlet, large spikes, one of the best grown; CALLIPHON, rose, streaked brighter colour, light centre; CAPTAIN BOYTON, red, bluish centre, white spots on lower petals; COUNTESS OF PEMBROKE, rich purple, flaked lake; DAMIA, white, tinged pale purple or lilac; DELICATISSIMA, white, shaded lilac; DR. BENSON, light scarlet, purple centre; DR. HOGG, mauve, suffused rose, centre white; DUKE OF TECK, blush-white, rosy-red centre, fine; EARL OF AIRLIE, orange-red, crimson-scarlet mark on lower petal; ELECTRA, pale rosy-purple, violet stripe on lower petal, fine, well-formed; FÉLICIEN DAVID, rosy-cerise, striped carmine; HELUM, violet-purple, deep purple flake; HESPERIA, orange-scarlet, purple throat; HOGARTH, white, lower part flaked lilac-purple; LADY BRIDPORT, blush, striped carmine, extra large and fine; LADY CARRINGTON, pale lilac, white centre, very fine; LADY LEIGH, white, tinted rose, flaked pale purple; LA FRANCE, pale flesh-colour inside, flaked rosy-purple outside, lower petals purple, tipped yellow; L'ALSACE, pale canary, lower petal blotched dull carmine, very pretty; LEMOINEI, creamy, blotched maroon-crimson, good decorative variety; LORD BYRON, scarlet, spot white; LORD POWIS, white, bordered rose, flaked red; MADAME VILMORIN, bright rose, white centre; MARCIANUS, orange-red, striped carmine, fine; MARÉCHAL BAZAINE, scarlet, white centre, and flake on each petal; MARS, deep scarlet; MASQUE DE FER, bronzy-red, lower segments darker, velvety, yellow spot in centre; MR. DERRY, pale lilac-purple, veined rosy-purple, fine; MR. THORNTON, purplish-crimson, veined red; MRS. J. EYTON, white, shaded and striped lilac-rose; MRS. LAXTON, rosy-red, ivory-white centre; NAPOLEON III., scarlet, blotched white: NEOCLES, white, purple on the lower petals; PICTUM, salmon-scarlet, flaked carmine, fine; QUEEN MARY, white, purplish-violet stripe on lower petal, fine; REMBRANDT, brilliant-scarlet, good; REMUS, bright rosy-purple, flaked crimson; REV. M. J. BERKELEY, orange-scarlet, flaked carmine, pure white centre; RICHARD DEAN, light crimson, carmine stripe on lower petal; SIR STAFFORD NORTHCOTE, salmon-red, flaked crimson; SOLFATERRE, yellow, spotted carmine; TELAMON, flesh-colour, flaked carmine, white throat; THOMAS METHVEN, violet, tinted rose; UNA, scarlet, white centre, petals flaked white, fine; VICTORY, crimson, flaked purple centre, fine; W. E. GUMBLETON, rosy-purple, striped carmine, maroon spots, fine decorative variety; YELLOW KING, yellow, orange centre, flaked carmine.

Gladiolus—*continued.*

GLADWYN. *See* **Iris fœtidissima.**

GLANDULAR. Covered with hairs, bearing glands upon their tips.

GLANDULOSE. Bearing glands.

GLANDULOSO-SERRATE. Having serratures tipped with glands.

GLAREOSE. Growing in gravelly places.

GLASS. The quality and thickness of Glass are important considerations in the construction of houses for horticultural purposes. Since the value of light for plants has been more fully recognised, and Glass of good quality has become much cheaper, improvements have been generally made which entirely supersede the old system of inserting very small panes. Various sorts of Glass have been tried at different times, but none is found to equal good sheets of not less than 21oz. or 24oz. to the square foot, where the panes are intended to be large. It is not advisable to have the latter more than 3ft. long for any plant structure, on account of their weight and the expense of repairs, should any breakage occur. Opaque corrugated Sheet-glass, and rough or unpolished Plate-glass, have each been tried for various plant houses, but have been found unsuitable on account of admitting insufficient light in dull weather, and also as not affording the requisite shade for tender plants in summer without additional covering being applied. Green-tinted Glass is sometimes used where a subdued light is desirable, such as a house devoted to ferns. This does not prevent the necessity of giving other shade in addition on bright summer days. Excepting for frame sashes or small panes in houses, Glass that only weighs 16oz. to the square foot should not be used for glazing any framework that is exposed to hail or snow storms and other rough weather. Curvilinear roofs require specially bent Glass for certain parts, which, however, costs nearly double the price of the ordinary kind, and consequently renders repairs to such structures considerably more expensive. If Glass is of bad quality, the destruction, by burning, of the tender foliage of plants beneath is almost certain. This is caused by numerous defects in the Glass acting as foci.

GLASSWORT. *See* **Salicornia.**

GLASTONBURY THORN. *See* **Cratægus Oxyacantha præcox.**

GLAUCESCENT. Having something of a bluish-green, hoary, or sea-green appearance.

GLAUCIUM (from *glaukos*, greyish-green; referring to the hue of the leaves). Horned Poppy. ORD. *Papaveraceæ.* A genus comprising five or six species of hardy, ornamental, glaucous, annual or biennial herbs, chiefly confined to the Mediterranean region, one being a native of Britain. Flowers yellow or crimson, solitary. Leaves lobed or dissected. Glauciums are of easy culture in any good garden soil. They may be propagated by seeds, sown in April or May, in the open ground. The seedlings, when large enough to handle, should be transferred to their flowering quarters.

G. corniculatum (horned). A synonym of *G. phœniceum.*

G. flavum (yellow).* *fl.* bright yellow, large. June to August. Pod nearly 1ft. long. *l.*, radical ones numerous, stalked, pinnatifid, hairy. *h.* 1ft. to 2ft. Europe (Britain), North Africa, and West Asia. Whole plant glaucous. SYN. *G. luteum.* (Sy. En. B. 66.)

G. luteum (yellow). A synonym of *G. flavum.*

Glaucium—*continued.*

G. phœniceum (purple).* *fl.* crimson, with a black spot at the base of each petal. June. *l.* oblong, pinnatifid, hairy. *h.* 9in. England (probably naturalised). SYN. *G. corniculatum.* (Sy. En. B. 65.)

GLAUCOUS. Covered with a fine bloom.

GLAUX (the name given by Dioscorides to another plant; from *glaukos*, greyish-green). Black Saltwort; Sea Milkwort. ORD. *Primulaceæ.* A pretty little herbaceous perennial, rarely seen in gardens. It thrives in a moist sandy soil, and may be propagated by seeds.

G. maritima (sea). *fl.* of a pale pink colour, not two lines long, solitary, nearly sessile and axillary; corolla wanting; calyx deeply five-lobed. Summer. *l.* small, mostly opposite, sessile, ovate, oblong or almost linear, entire. *h.* 3in. to 6in. Europe (Britain), North and West Asia, and North America, on sands, salt-marshes, and muddy places, near the sea. (Sy. En. B. 1150.)

GLAZING. Numerous systems of Glazing have, of late years, been invented and patented, all being chiefly directed against the use of putty, and professing to offer advantages over the ordinary method, such as cheapness in construction, durability, the admission of additional light, and special facilities for repairing broken glass. Although some of these methods are largely adopted, and answer well in the case of extensive glass buildings, their use for horticultural purposes is by no means general. One of the best patent systems introduced is that known as Rendle's, in which the panes of glass are fitted at the top and bottom into horizontal grooves formed of bent zinc, and are slightly lapped on each other at the sides. The zinc grooves are made to conduct the water down the roof from the outside, and also that caused by condensation underneath. This renders the structure remarkably free from drip inside, which is an important consideration. No putty is used, and the plan answers equally well either with straight or curvilinear roofs, the glass being kept in place by indiarubber wedges. Various other modes are recommended by different makers, some having strips of felt along the sides of the panes, and a metal ridge on each rafter, screwed on the felt sufficiently close to hold all firmly underneath. The use of putty is requisite with sashes that are movable, either as ventilators or for covering frames, to prevent the glass shaking out or becoming displaced. In Glazing, the panes may vary in size, according to the dimensions of the house or pit. Unless the roof be very flat, the laps should not exceed ⅜in., and they should be made as air-tight as possible, each pane being secured in position before the putty is put on by small pieces of zinc made for the purpose. The larger the panes are, the more light do they admit; but a length of 2½ft. or 3ft. must be an outside limit, with a width not much exceeding 1ft. Great pressure is put on the surface of glass houses by rough winds, and by snow in winter; and, in order to withstand this, the quality of the glass and proper Glazing must be insured in the first instance.

GLAZIOVA. Included under **Cocos** (which *see*).

GLECHOMA. Now included under **Nepeta** (which *see*).

GLEDITSCHIA (named after Gottlieb Gleditsch, of Leipsic, 1714-1786, Director of Botanic Gardens at Berlin). SYN. *Gleditsia.* ORD. *Leguminosæ.* A genus comprising about half-a-dozen species of ornamental, mostly hardy, deciduous trees, inhabiting temperate or sub-tropical Asia and North America (one of them tropical African). Flowers greenish, disposed in spikes. Leaves abruptly pinnate and bipinnate on the same tree. Branches supra-axillary, frequently converted into branched spines. The species are of easy culture in almost any soil. Propagated by seeds, obtained from their natural habitats, and sown in March, about 1in. deep.

G. horrida (horrid). A synonym of *G. sinensis.*

G. monosperma (one-seeded). Water Locust. *fl.* greenish. Summer. *l.*, leaflets ovate-oblong, acute; spines slender, few, usually trifid. *h.* 30ft. to 40ft. United States, 1723.

Gleditschia—*continued.*

G. sinensis (Chinese). *fl.* greenish. Summer. *l.*, leaflets ovate-elliptic, obtuse; spines robust, conical, rameal ones simple or branched, cauline ones in fascicles, branched. *h.* 30ft. to 50ft. China, 1774. SYN. *G. horrida.*

G. triacanthos (three-spined).* Honey Locust. *fl.* greenish. Summer. *l.*, leaflets linear-oblong, lucid; spines robust, compressed at the base, but cylindrically conical at the apex, simple or trifid. *h.* 30ft. to 50ft. United States, 1700. There are several varieties of this fine tree, including an unarmed one, also one with a pendulous habit. (W. D. B. ii. 133.)

GLEDITSIA. A synonym of **Gleditschia** (which *see*).

GLEICHENIA (named in honour of W. F. Gleichen, 1717-1783, a German botanist). ORD. *Filices.* A genus comprising about thirty species of ornamental stove and greenhouse ferns. Caudex mostly creeping. Fronds rarely unbranched, generally dichotomously divided; pinnæ deeply pinnatifid, with the segments small and concave. Sori of few (usually two to four) sessile capsules, situated on a lower exterior veinlet. For general culture, *see* **Ferns.**

G. acutifolia (acute-leaved). A synonym of *G. quadripartita.*

G. Bancroftii (Bancroft's). A synonym of *G. longissima.*

G. bifurcata (twice-forked). A synonym of *G. flagellaris.*

G. bracteata (bracteate). A synonym of *G. flagellaris.*

FIG. 112. GLEICHENIA CIRCINATA.

G. circinata (circinate).* *fronds*, lobes of the pinnæ ovate or sub-rotund, more or less glaucous beneath, the margins slightly recurved; branches and rachis glabrous, or more or less pubescent. Capsules three to four, superficial. Australia. Stove. See Fig. 112. SYNS. *G. microphylla, G. speluncæ.* The variety *semi-vestita* has the rachises and young fronds very paleaceo-pubescent. See Fig. 113.

G. cryptocarpa (hidden-fruited). *fronds* proliferous, coriaceous, deep yellow or yellow-brown when dry; branches dichotomously flabelliform; pinnæ broad-lanceolate, sub-erect and compact, 4in. to 5in. long, 1in. broad, pectinato-pinnatifid; segments narrow-linear, strongly veined, the margins singularly revolute, concealing the sori. Capsules one to four in a sorus. *h.* 3ft. Chili, 1865. Greenhouse.

C. Cunninghami (Cunningham's). *fronds* often proliferous, coriaceous; branches dichotomously flabelliform, glaucous beneath, hairy; pinnæ linear-lanceolate, acuminate, 4in. to 6in. long, ½in. to 1in. broad; segments linear, acute. Capsules two to four in a sorus. New Zealand. Greenhouse. (H. S. F. i. 6B.)

G. dicarpa (two-fruited).* *fronds*, lobes of the pinnæ round, sub-hemispherical, very fornicate. Capsules two, concealed within the almost slipper-shaped lobes, and mixed with ferruginous, paleaceous hairs, which often extend to the rachis. Australia. A variable stove species. (H. S. F. i. 1C.) The variety *alpina* is generally smaller and more compact, rachis and young shoots ferruginous with paleaceous wool. SYN. *G. hecistophylla.* (H. S. F. i. 2B.) Another elegant variety, introduced in 1879, is *longipinnata*, in which the fronds are longer than those of the type, and the growth is exceedingly graceful.

G. dichotoma (forked).* *sti.* zigzag, repeatedly di- or trichotomous, the ultimate branches bearing a pair of forked pinnæ, about 8in. long and 2in. wide; segments never decurrent, glau-

Gleichenia—*continued.*

cous beneath. Tropical regions. Stove. SYNS. *G. ferruginea, G. Hermanni, G. rufinervis,* and many others.

G. excelsa (tall). A synonym of *G. longissima.*

G. ferruginea (rusty). A synonym of *G. dichotoma.*

G. flabellata (fan-shaped). *fronds* very proliferous; branches dichotomously flabelliform; pinnæ ascending, about 6in. long, 1in. to 2in. broad, lanceolate; segments linear. Australia, &c., 1823. Greenhouse.

G. flagellaris (whip-like).* *fronds,* branches glabrous, repeatedly dichotomous, copiously foliaceous, glabrous, often glaucous beneath, sub-coriaceo-membranaceous; pinnæ erecto-patent or divaricating, extremely variable, broad or narrow, or linear-lanceolate, 5in. to 1ft. and more long; segments ¼in. to 2in. and more long, linear, sometimes ferrugineo-tomentose at the base beneath. Capsules two to four. Mauritius and Bourbon, Madagascar; abundant in Java and Malay Islands. Stove. SYNS. *G. bifurcata, G. bracteata, G. lævigata, G. plumæformis.*

G. furcata (forked). A synonym of *G. pubescens.*

G. gigantea (gigantic). A synonym of *G. longissima.*

G. glauca (glaucous). A synonym of *G. longissima.*

G. hecistophylla (smallest-leaved). A synonym of *G. dicarpa alpina.*

G. Hermanni (Hermann's). A synonym of *G. dichotoma.*

G. lævigata (smooth). A synonym of *G. flagellaris.*

G. longipinnata (long-pinnated). A synonym of *G. pubescens.*

G. longissima (longest).* *sti.* stout, forked; branches very long; pinnæ numerous, 4in. to 8in. long, 1in. to 2in. broad, deeply pinnatifid; segments linear, acuminated, or oblong, China and Japan. Greenhouse. SYNS. *G. Bancroftii, G. excelsa, G. gigantea, G. glauca.* (H. S. F. i. 3B.)

FIG. 113. GLEICHENIA CIRCINATA SEMI-VESTITA.

G. Matthewsii (Matthews's). A synonym of *G. pubescens.*

G. microphylla (small-leaved). A synonym of *G. circinata.*

G. pectinata (combed).* *sti.* zigzag, branched; branches bearing one to three pairs of forked divaricating pinnæ; segments never decurrent, frequently glaucous beneath. *sori* of eight to ten capsules. Tropical America, 1824. Very distinct. Stove.

G. plumæformis (feather-formed). A synonym of *G. flagellaris.*

G. pubescens (downy).* *sti.* and rachises often woolly; branches of the frond repeatedly dichotomous, leafy; pinnæ 5in. to 2ft. long, 1in. to 2in. broad, pectinato-pinnatifid, clothed with cobwebby pubescence; segments spreading, linear. Capsules two to five. Tropical America. Stove. SYNS. *G. furcata, G. longipinnata, G. Matthewsii, G. tomentosa.*

G. quadripartita (quadripartite). *fronds* coriaceous, black when dry, rufous-brown beneath, not proliferous, only once-forked; each branch dichotomously flabelliform; pinnæ lanceolate, acuminate, falcately curved, pectinato-pinnatifid, 4in. to 6in. long, 1in. to 1½in. broad; lobes narrow-linear, sub-falcate, sharply acute, the margins a little recurved. Capsules one to three in a sorus. Straits of Magellan. Greenhouse. SYN. *G. acutifolia.*

G. rufinervis (red-nerved). A synonym of *G. dichotoma.*

G. rupestris (rock).* *fronds* 2ft. to 6ft. long; lobes of pinnæ rounded or obtusely sub-quadrangular, coriaceous; margins thickened and recurved, sub-glaucous beneath. *sori* of three or four capsules, superficial. Australia, 1860. Greenhouse. Perhaps only a variety of *G. circinata.*

G. speluncæ (cavern). A synonym of *G. circinata.*

G. tomentosa (tomentose). A synonym of *G. pubescens.*

GLEICHENIACEÆ. A group or sub-order of *Filices.*

GLOBBA (native Molucca name). SYN. *Sphærocarpus.* ORD. *Zingiberaceæ.* A genus of about twenty-four species of pretty stove herbaceous perennials, natives of India and the Malayan Archipelago. Flowers yellow or pinkish, very curious-looking; calyx three-cleft, tubular; corolla with a slender tube. Globbas are of easy culture in a warm, moist stove; and may be readily increased by dividing the roots.

G. atro-sanguinea (dark red).* *fl.* yellow, with scarlet bracts, disposed in dense terminal racemes. In blossom the greater part of the year. *l.* alternate, ovate-lanceolate, acuminate, deep glossy green. Stems about as thick as a goose quill, much crowded, 1ft. to 1½ft. long, gracefully arching on all sides. Borneo, 1881. An elegant plant. SYN. *G. coccinea.* (B. M. 6626.)

G. coccinea (scarlet). A synonym of *G. atro-sanguinea.*

G. Schomburgkii (Schomburgk's).* *fl.* golden-yellow, with a bright orange-red base to the lip; panicle drooping; lip narrowly cuneate, with a broad, retuse, truncate end. August. *l.* elliptic-ovate or lanceolate, with slender acuminate tips, contracted into a short petiole above the vagina. Stems tufted, 6in. to 12in. high. Siam, 1864. (B. M. 6298.)

G. sessiliflora (sessile-flowered). *fl.* yellow; spike whorled; lateral segments of corolla longest; bracts lanceolate, withering. August. *l.* lanceolate, acuminate. *h.* 1½ft. Pegu, 1807. (B. M. 1428.)

GLOBE AMARANTH. *See* **Gomphrena globosa.**

GLOBE FLOWER. *See* **Trollius.**

GLOBE MALLOW. *See* **Sphæralcea.**

GLOBE THISTLE. *See* **Echinops.**

GLOBOSE, GLOBULAR. Round or spherical.

GLOBULARIA (from *globulos,* a small round head; in allusion to the form of the capitate flower). ORD. *Selagineæ.* A genus comprising twelve species of hardy or greenhouse perennial herbs, shrubs, or sub-shrubs, inhabiting the Mediterranean region, &c. Flowers collected upon a common receptacle, surrounded by a many-leaved involucre. Leaves radical or alternate, coriaceous, obovate-oblong or lanceolate, entire or argutely sparingly toothed. Globularias are pretty plants for the rock garden, in a moist, free soil; they may also be grown in the margins of borders. Propagated by seeds, or by division.

G. Alypum (Alypum).* *fl.-heads* pale, terminal. August and September. *l.* lanceolate, three-toothed and entire. Stem shrubby. *h.* 2ft. South Europe, 1640. Greenhouse shrub. See Fig. 114. (Fl. Ment. 34.)

G. cordifolia (heart-leaved). *fl.-heads* blue, small, globular, solitary, terminal. Summer. *l.* petiolate, obovate-cuneate, emarginate. Stem shrubby, prostrate, much branched. Europe, Western Asia, 1633. Hardy sub-shrub.

FIG. 114. FLOWER-HEAD OF GLOBULARIA ALYPUM.

G. longifolia (long-leaved). *fl.-heads* white, axillary, sub-sessile, solitary. July and August. *l.* lanceolate, linear, entire. Stem shrubby. *h.* 3ft. Madeira, 1775. Greenhouse. (B. R. 685.)

G. nana (dwarf). *fl.-heads* bluish, globular, nearly ¼in. in diameter. Summer. *l.* radical, fleshy, narrowly obcordate-cuneate. Stem woody, creeping, prostrate. South Europe, 1824. Hardy herb.

G. nudicaulis (naked-stemmed).* *fl.-heads* blue, larger than

Globularia—*continued.*

those of *G. cordifolia*. Summer. *l.* radical, oblong, crenate obtuse. Stems herbaceous. *h.* 6in. South Europe, 1629. Hardy herb.

G. trichosantha (hairy-flowered). *fl.-heads* light blue, large. Summer. *l.*, radical ones spathulate, sometimes tridentate; cauline ones linear, mucronate. Stem herbaceous, leafy. *h.* 6in. to 8in. Asia Minor. Plant glaucescent. Hardy herb.

G. vulgaris (common).* *fl.-heads* bright blue, dense, terminal; involucre of nine to twelve imbricated leaflets. Summer. *l.*, radical ones spathulate, emarginate, or shortly tridentate; cauline ones small, lanceolate. Stems herbaceous, erect. *h.* 6in. to 12in. Europe, 1640. Hardy herb. (B. M. 2256.)

GLOBULARIEÆ. A synonym of *Selagineæ*.

GLOBULEA. Included, by Bentham and Hooker, under *Crassula*.

GLOMERATE. Gathered into round heaps or heads.

GLONERIA. Included under **Psychotria** (which *see*).

GLORIOSA (from *gloriosus*, full of glory; referring to the handsome flowers). SYNS. *Clynostylis, Methonica.* ORD. *Liliaceæ*. A genus comprising three species of very ornamental, usually stove bulbs. Flowers axillary, in racemes on the ends of the stems, which bear leaves remarkable in having tendril-like apices. Propagation is effected by seeds and by offsets. Seeds are best inserted singly, in small pots, in January, using a light sandy soil, and plunging in bottom heat. Offsets should be carefully removed from old bulbs when starting them in spring, as the roots are very brittle, and are easily injured if division is attempted at other times. Good drainage is always essential, and an open soil, composed of loam and peat in about equal proportions, is recommended. The bulbs should be carefully repotted in February, and then started in a temperature of about 70deg. Plenty of heat and moisture are necessary in summer; but, as the growth ripens, water should be gradually withheld. During winter, the soil must be kept quite dry, and the pots laid on their sides in a warm place. Exposure to cold, when at rest, is a point specially to be avoided. The winter treatment applies alike to seedlings and established bulbs. Gloriosas are frequently very slow-growing, and are impatient of root disturbance on account of their brittleness. The seasons of growth and complete rest in a warm place, are most important considerations in their culture.

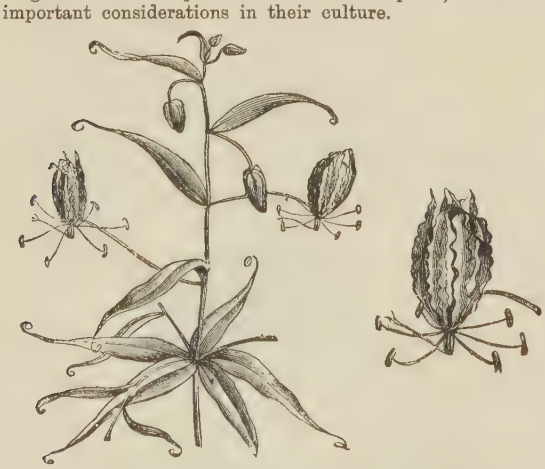


FIG. 115. FLOWERING BRANCH AND SINGLE FLOWER OF GLORIOSA SUPERBA.

G. superba (superb).* *fl.* deep rich orange and red; perianth segments narrow, deeply undulate and crispate, erect. Summer. *h.* 6ft. Tropical Asia and Africa, 1690. See Fig. 115. (A. B. R. 129; B. R. 77.)

G. virescens (greenish). *fl.* deep orange and yellow; perianth segments spathulate; margins not crispate, and but slightly undulated. *h.* 4ft. Mozambique, 1823. (B. M. 4938.) *G. Plantii* is the form with reddish-yellow flowers. The variety *grandiflora* (*Methonica grandiflora*, B. M. 5216) is a tropical African form, with much larger flowers than the type.

Gloriosa—*continued.*

GLORY PEA. *See* **Clianthus.**

GLOSSARRHEN. A synonym of **Schweiggeria.**

GLOSSASPIS. A synonym of **Glossula.**

GLOSSOCOMIA. A synonym of **Codonopsis.**

GLOSSODIA (from *glossa*, a tongue, and *eidos*, like; alluding to the tongue-like appendage within the flower). ORD. *Orchideæ*. A genus comprising about four species of greenhouse terrestrial orchids, limited to Australia. Flowers purple or blue, erect, one or two on an erect scape, leafless except an empty sheathing bract at or below the middle, and a similar one under each pedicel; lip sessile, undivided, not fringed. Leaf solitary, oblong or lanceolate, from within a scarious sheath close to the ground. Glossodias thrive in sandy loam and peat, and require but little water when in a dormant state. Propagated by division.

G. major (larger). *fl.* blue; sepals and petals oblong-lanceolate, obtuse, not blotched; lip ovate, broad, biconvex and pubescent with white hairs in the lower half, upper half lanceolate, blue and glabrous. June. *l.* oblong or lanceolate, 1in. to 2in. long. Tuber ovoid. 1810. SYN. *Caladenia major.*

G. minor (smaller). *fl.* blue; sepals and petals oblong-lanceolate; lip about one-third the length of the sepals, broad, biconvex and pubescent in the lower half, the spreading upper half triangular, acute, flat, glabrous. June. *l.* lanceolate, the small sheathing bract usually green. 1810. SYN. *Caladenia minor.*

GLOSSULA (from *glossa*, a tongue; in reference to the tongue-like segments of the labellum). SYN. *Glossaspis.* ORD. *Orchideæ*. A monotypic genus, the species being a curious tuberous-rooted stove orchid, peculiar to the island of Hong Kong and the adjacent mainland. For culture, *see* **Glossodia.**

G. tentaculata (feeler-flowered). *fl.* green, small, in a slender, erect spike; lip deeply three-lobed; lobes long and thread-like, somewhat resembling the antennæ of an insect, hence the specific name. December. *l.* few, at base of the stem. *h.* 9in. (B. R. 862.)

GLOTTIDIUM. Now included under **Sesbania** (which *see*).

FIG. 116. DROOPING-FLOWERED GLOXINIA.

GLOXINIA (named in honour of Benj. Petr. Gloxin, of Colmar, a botanical writer). SYNS. *Escheria* and *Salisia* (of Regel). ORD. *Gesneraceæ*. A genus containing six species of elegant stove plants, all natives of tropical America. Flowers variously coloured, sometimes

Gloxinia—*continued.*

FIG. 117. ERECT-FLOWERED GLOXINIA.

variegated with spots, axillary, usually singly or a few together, large, nodding. Leaves opposite, stalked. The innumerable forms which are cultivated as Gloxinias

FIG. 118. ERECT-FLOWERED GLOXINIA.

Gloxinia—*continued.*

rightly belong to the genus *Sinningia*, and most of them are derived from *S. speciosa*. On account, however, of their being so universally known as Gloxinias, the cultivation is here given.

Few stove plants are more beautiful than Gloxinias; and they may, by potting successionally, be had in flower throughout the greater part of the year. They always prove attractive in a warm house, and are very useful for cutting. The flowers originally were all drooping, as shown in Fig. 116, which detracted considerably from their beauty, as now exhibited in the numerous varieties with erect flowers (see Figs. 117 and 118). Some have colours of intense rich crimson; others are pure white, or are delicately spotted and pencilled internally.

Propagation. Gloxinias may be annually increased in large quantities by seeds, and by cuttings of the stems or leaves. Seeds should be sown early in February, in well-drained pots or small pans of finely-sifted soil, composed of peat, leaf mould, and sand, in about equal proportions. After the seeds are thinly sown, and only very slightly covered with soil, they should be carefully watered, placed in a temperature of about 70deg., and kept shaded. On the appearance of the seedlings, a sharp look-out must be kept, to prevent them damping; and, as soon as large enough, they should be pricked off, about 1in. apart, in other pots of similar soil, and, in due course, potted into single ones. Seedlings form good plants, and flower the same season, if sown early, and afterwards grown on without check, being always kept shaded, and in a moist, warm temperature. Cuttings of shoots may be secured when the old bulbs are started in spring; they strike very readily in a close propagating frame, and make good plants for flowering the following summer. Leaf cuttings may be inserted when the plants are ripening, or at other times if firm ones can be spared. They should be inserted with a small portion of the petiole attached—a bulb forms at the base of this for flowering the next year. A method of propagating more rapidly by matured leaves, is to cut through the midribs at the back of each, at distances of about 1in. apart,

FIG. 119. GLOXINIA DIVERSIFLORA.

Gloxinia—*continued.*

and peg them down flat on pans of light soil, or on cocoa fibre, in a propagating frame. Numerous bulbils will eventually be formed at all the firmer parts of the midribs where incisions have been made, and may be collected from the soil or fibre when the other portions of the leaf are decayed.

Cultivation. Gloxinias are naturally summer-flowering plants, and should be started into growth about February, or earlier, if desired. A portion may be retained for a succession, to be followed, in early autumn, by seedlings, thus securing a long period for a display with even a limited number of plants. The roots should be removed from the dry soil in which they have been stored, or from other sources, as the case may be, placed in small pots, and stood in a temperature of about 65deg. The soil best suited is leaf mould, not too much decayed, and lumpy peat, in equal proportions, with the addition of a little sand or charcoal. Loam is sometimes used, but it is not required if watering is attended to. The pots should be well drained, and nearly filled, the bulbs being pressed in and covered with soil, which is best raised above them in the middle of the pot. No water is required until growth begins, except a little syringing round the pots, to prevent the soil becoming too dry. When growing, the plants require plenty of water, and are much benefited by copious syringings with tepid water morning and evening, in summer. Cold water must on no account be applied, or much injury will ensue. Before the small

FIG. 120. GLOXINIA GESNEROIDES.

Gloxinia—*continued.*

pots are filled with roots, and if the plants are calculated to grow strongly, a shift into the flowering sizes, which range from 5in. to 8in. in diameter, may be effected. A light position, and shading from sunshine, will ensure a sturdy growth, which eventually produces flowers of good substance. Air should be carefully admitted, and the leaves handled with caution, as they are exceedingly brittle. Artificial manure, or manure water, is beneficial when the flowers appear, but it should be kept from the foliage. The flowers last longer if the plants are subjected to a cooler temperature and more air at the flowering season. As the leaves ripen, water should be withheld; and when they die away, the roots may be stored in a dry place till the following spring, but they must not be exposed to cold.

Insects. The leaves and flower-stalks are frequently much injured by Thrips. If these are allowed a footing, it is difficult to effect eradication; but injury may be largely prevented by maintaining a moist atmosphere during the time the plants are growing.

G. diversiflora (variable-flowered). A pretty, dwarf, free-flowering hybrid, probably of garden origin. See Fig. 119.

G. gesneroides (Gesnera-like) is said to be a hybrid between a Sinningia and *Gesnera Donkelaariana.* It has fiery-red flowers. See Fig. 120, for which we are indebted to Messrs. Carter. The absurdity of the name is apparent; it is mentioned here solely because it is known by no other name in gardens.

G. glabra (glabrous). *fl.* white; throat yellow, spotted with purple; corolla funnel-shaped; lobes nearly equal, with wavy, finely-fringed edges; calycine segments foliaceous; peduncles axillary, solitary, one-flowered. August. *l.* ovate, acute, serrated, glabrous. Stem erect, simple, sub-tetragonal. *h.* 9in. 1847. (B. M. 4430, under name of *G. fimbriata.*)

G. maculata (spotted). *fl.* purplish-blue, downy; peduncles axillary, one-flowered, solitary. June to October. *l.*, radical ones cordate, obtuse, doubly toothed, shining above, reddish beneath. Stems simple, spotted. *h.* 1ft. South America, 1739. (B. M. 1191.)

G. multiflora. *See* **Nægelia amabilis.**

G. pallidiflora (pale-flowered). *fl.* pale blue; lobes of corolla concave; calycine segments linear, reflexed. August. *l.* broad, sub-obliquely ovate, obscurely serrated, rather pilose above. Stem erect, simple, spotless. *h.* 1ft. Santa Martha, 1844. (B. M. 4213.)

G. Passinghamii (Passingham's). A synonym of *Sinningia speciosa.*

G. speciosa (showy). A synonym of *Sinningia speciosa.*

Varieties. As a much greater variety in colour may be secured from mixed seeds than from a limited number of named sorts, the general and most satisfactory method of growing seedlings is here recommended. Seeds of erect and drooping varieties are sold in separate mixtures.

GLUMES. The floral envelopes of grasses.

GLUTINOSE. Adhesive, gluey.

GLYCINE (from *glykys*, sweet; the leaves and roots of one or two of the species are sweet). ORD. *Leguminosæ.* A genus of about twelve species of stove or greenhouse, twining or prostrate, slender or rarely sub-erect herbs, distributed over Asia, Africa, and Australia. *G. hedysaroides* (probably the only species introduced) thrives in a compost of peaty loam and a little sand. Propagated, in spring, by cuttings of young side shoots, inserted in sand, under a bell glass; or by seeds, sown in a hotbed.

G. Apios (Apios). A synonym of *Apios tuberosa.*

G. biloba (two-lobed). A synonym of *Cologania biloba.*

G. hedysaroides (Hedysarum-like). *fl.* purple, axillary, usually five together. June. *l.*, leaflets ovate, obtuse, mucronate, pilose beneath. Branches twining a little. Stem erect, tomentose. Guinea, 1823. Stove.

GLYCOSMIS (from *glykys*, sweet, and *osme*, smell; in allusion to the scent of the leaves and flowers). ORD. *Rutaceæ.* A genus comprising five species of unarmed stove trees and shrubs, inhabiting tropical Asia and Australia, and (one, doubtful) Africa. Flowers small, in axillary, rarely terminal, panicles. Berries small. Leaves unifoliolate or impari-pinnate; leaflets alternate, entire or serrate. The species thrive in a rich mould. Increased by cuttings, inserted in sand, under a hand glass, in heat.

Glycosmis—*continued.*

G. arborea (tree-like). *fl.* white. May to August. *l.* pinnate, in two pairs; leaflets long, obsoletely serrate. *h.* 20ft. East Indies, 1796. Tree.

G. citrifolia (Citrus-leaved). *fl.* white; peduncles axillary, shorter than the stalk. January to December. *l.* simple, and three-leafleted; leaflets ovate-oblong, acuminate. *h.* 6ft. China. Shrub.

G. pentaphylla (five-leaved).* *fl.* white. June and July. *l.* pinnate, in two pairs; leaflets elliptical, entire. *h.* 20ft. East Indies, 1790. Tree.

GLYCYRRHIZA (the old Greek name used by Dioscorides, from *glykys*, sweet, and *rhiza*, a root; in reference to the sweetness of the root). Liquorice. Including *Liquiritia*. ORD. *Leguminosæ*. A genus comprising about twelve species of hardy herbaceous perennials. Flowers blue, violet, white, or yellow, in axillary racemes. Leaves pinnate. Root long, perpendicular, sweet. These rather coarse-growing plants succeed in a deep sandy loam. Propagated by divisions, each of which should have one or more buds. The species most cultivated is *G. glabra*, from which is obtained the true liquorice.

G. echinata (prickly). *fl.* purple, in racemes not half so long as the leaves. June and July. *l.*, leaflets oval-lanceolate, mucronate, glabrous; stipules oblong-lanceolate. *h.* 3ft. Europe, 1596. Whole plant glutinous to the touch. (B. M. 2154.)

G. glabra (glabrous).* *fl.* pale blue, distant; spikes or racemes pedunculate, shorter than the leaves. Summer and autumn. *l.*, leaflets ovate, rather retuse, and somewhat clammy beneath, as well as the branches. Stem only terete at the apex. *h.* 3ft. to 4ft. Europe, &c., 1562.

G. lepidota (scaly). *fl.* whitish; spikes pedunculate, shorter than the leaves, dense. July and August. Pods beset with hooked prickles. *l.*, leaflets 15in. to 19in. long, oblong-lanceolate, acute, squamulose, under surface covered with glandular dots. Root creeping. *h.* 2ft. to 3ft. North America, 1817. (B. M. 2150.)

GLYPHÆA (from *glyphe*, carving, carved work; in allusion to the markings of the fruit). ORD. *Tiliaceæ*. A genus containing two species of stove shrubs, natives of tropical Africa. Flowers yellow; cymes few-flowered, axillary, lateral or terminal. Leaves denticulate, three-ribbed. For culture, *see* **Apeiba.**

G. grewioides (Grewia-like). *fl.* bright yellow, 1½in. in diameter; cymes three to four-flowered, pubescent, with stellate hairs. September. *l.* glabrous, 4in. to 6in. long, membranous, oblong or ovate, rounded or slightly unequally cordate at the base, acuminate, acutely and irregularly toothed. Benguela, 1866. (B. M. 5610, under name of *Glyphæa Monteiroi*.)

GLYPHOSPERMA (from *glyphe*, carving, and *sperma*, seed; in allusion to the markings of the seed). ORD. *Liliaceæ*. A singular hardy plant, nearly allied to the European Anthericum. It has fascicled, fleshy, fibrous roots, and slender, soft, bright green, grass-like leaves. It thrives in any dry, sandy soil, but should be protected, during winter, from excessive moisture.

G. Palmeri (Palmer's). *fl.* white, starry, ⅔in. in diameter, in panicled racemes. *l.* linear, channelled, 1ft. to 1½ft. long. Northern Mexico, 1884. (B. M. 6717.)

GLYPTOSTROBUS. *See* **Taxodium.**

GMELINA (named in honour of S. Gottlieb Gmelin, a celebrated German naturalist and traveller, 1743-1774). ORD. *Verbenaceæ*. A genus containing eight species of stove evergreen trees, natives of East India, Eastern Asia as far as China, the Malayan Archipelago, and tropical Australia. Flowers blue, pale violet, or yellow. Leaves opposite, entire. Gmelinas thrive in a rich fibry loam. Propagated by cuttings, made of firm young shoots, and inserted in sand, in heat. They are seldom seen in cultivation in this country; and, in all probability, the species described below is the only one yet introduced.

G. Rheedii (Rheed's). *fl.* white; thyrse many-flowered; corolla downy, bilabiate. June to August. *l.* rhomb-cordate, sometimes three-lobed, tomentose beneath. *h.* 20ft. East Indies, 1824. Plant arboreous, downy. (B. M. 4395.)

GNAPHALIUM (from *gnaphalon*, soft down; woolly covering of the leaves). Cudweed; Everlasting. ORD.

Gnaphalium—*continued.*

Compositæ. A genus comprising about a hundred species of hardy, stove, or greenhouse, annuals, biennials, or perennials, spread over nearly the whole globe, from the tropics to the Arctic Circle. Flower-heads yellow or white, small, sessile, often clustered, rarely forming terminal corymbs; involucral bracts imbricated, scarious (whence the English name), and often coloured at the tips. Leaves alternate, entire, sessile, decurrent, or rarely petiolate. Few of the species (four of which are natives of Britain) are worthy of special mention in this work.

FIG. 121. GNAPHALIUM DECURRENS, showing Habit and Cluster of Flower-heads.

G. decurrens (decurrent). *fl.-heads* white, in cymosely disposed glomerules. July and August. *l.* strongly scented, lanceolate or linear, white beneath. *h.* 2ft. to 3ft. North America. Hardy perennial. See Fig. 121.

G. Leontopodium. *See* **Leontopodium alpinum.**

G. margaritaceum (pearly). Pearl Cudweed. A synonym of *Antennaria margaritacea*.

GNETACEÆ. A small order of shrubs, rarely trees, natives, for the most part, of tropical regions. Flowers monœcious or dicœcious, with sheaths or laciniate scales, the female with a membranous, tubular, bifid, calyciform sheath. Leaves opposite, reticulated, sometimes scaly. The seeds of some of the species are edible. There are three genera—the best-known of which are *Ephedra* and *Welwitschia*—and about thirty species.

GNIDIA (pertaining to Gnidus, a town in Crete; a name given by the ancients to the Laurel). ORD. *Thymelaceæ*. A rather large genus (about fifty species are known) of greenhouse evergreen shrubs or under-shrubs; found in the Southern and Eastern tropical parts of Africa. Flowers white or pale yellow, inconspicuous; calyx funnel-shaped, with a regular four-cleft limb. Leaves scattered or opposite. Branches slender. The plants require a moist atmosphere, and a situation close to the glass. In other respects, they should be treated like **Pimelea** (which *see*).

G. denudata (shaven). *fl.* pale yellow. May to July. *l.* ovate-oblong, imbricated, hairy, with naked nerves. *h.* 1½ft. Cape of Good Hope, 1820. (B. R. 757.)

G. oppositifolia (opposite-leaved). *fl.* pale yellow, terminal; scales four. May to July. *l.* opposite, ovate, tomentose. *h.* 1ft. Cape of Good Hope, 1783. (B. M. 1902.)

G. pinifolia (Pine-leaved).* *fl.* creamy-white, very fragrant, disposed in umbellate heads. March and April. *l.* scattered, three-cornered. *h.* 1ft. Cape of Good Hope, 1768. (B. M. 2016.)

G. tomentosa (downy). *fl.* pale yellow, sessile, collected into a sort of fasciculated head at the extremity of the younger shoots, and surrounded by four closely-placed leaves, which form an involucre; tube long and slender, swollen at the base, clothed externally with long, white, rather silky hairs; segments faintly three-nerved. March and April. *l.* opposite, decussate, more or less spreading, sometimes reflexed, ovate or ovate-lanceolate,

Gnidia—*continued.*

very often approaching to oblong or elliptical, sessile, rather obtuse at the point, five-nerved, hairy. *h.* 3ft. to 4ft. Cape of Good Hope. (B. R. 2761.)

GOAT MOTH (*Cossus ligniperda*). The Goat Moth produces not only one of the largest of known European caterpillars, but also one of the most destructive to timber and fruit trees. The perfect insect measures from 2¾in. to 3in. from point to point of its fore wings, which are of an ashy-brown colour, shaded with dark brown, especially across the middle, and marked with many irregular transverse streaks, in the form of network. The hind wings are brown, the reticulation being marked with somewhat obscure lines; hence, the insect is difficult to detect while at rest, with folded wings, upon the stems of trees during the day. The female has a powerful ovipositor for the purpose of securing her eggs in crevices of the bark. As soon as the larvæ are hatched, they commence to eat away the bark next them, and, as growth proceeds, make their way towards the heart of

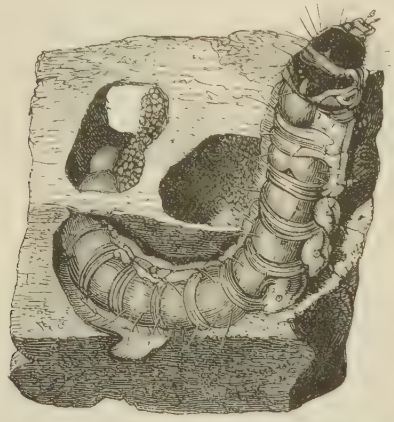


FIG. 122. LARVA OF GOAT MOTH.

the tree. The caterpillar (see Fig. 122) when fully grown, measures 4in. long, and is as thick as a man's finger. It exudes a liquid of a powerful and fœtid odour, somewhat resembling the unpleasant effluvium exhaled by the he-goat, whence the English name. The body is smooth, and bears short, scattered hairs; it is dark red on the back, with spiracles, or breathing apertures, of the same colour along the sides; the sides and under surface of the body are flesh-coloured, and the head is black. The jaws are very powerful, and capable of cutting the hardest wood. When two years old, the caterpillar changes to light yellow, surrounds itself with a strong cocoon, made of chips of wood, and assumes the pupa state—generally in spring, the perfect insect appearing in June or July.

Remedies. The remedies suggested are: Coating the trees with a mixture of cow-dung and clay, to prevent egg-laying; injecting paraffin or sulphur fumes into the holes; and felling the trees, splitting up, and destroying the caterpillars when badly infested.

GOAT'S BEARD. *See* **Spiræa Aruncus** and **Tragopogon.**

GOAT'S FOOT. *See* **Oxalis caprina.**

GOAT'S RUE. *See* **Galega.**

GODETIA. Included under **Œnothera** (which *see*).

GODOYA (named in honour of E. Godoy, a Spanish statesman, 1764-1839—commonly called Prince of the Peace, on account of his having concluded a peace between France and Spain—a patron of botany). ORD. *Ochnaceæ.* A genus comprising two species of stove trees, natives of Peru and New Grenada. Flowers yellow or white, disposed in terminal and axillary racemes or

Godoya—*continued.*

panicles; calyx twin-formed. Leaves alternate, coriaceous, thick, simple, marked with numerous transverse veins. Godoyas delight in a compost of peat and loam. Propagated by cuttings, inserted in sand, under a glass, in a strong bottom heat.

G. geminiflora (bud-flowered). *fl.* yellow; racemes axillary or terminal, compound, elongated. June. *l.* oblong, bluntish, obsoletely serrulated. *h.* 20ft. Brazil, 1820. An elegant species.

G. splendida (splendid).* *fl.* pure white, fragrant, ten to fifteen on a spike. *l.* pinnate, large. *h.* 10ft. Columbia, 1869. A compact-growing plant.

GODWINIA GIGAS. *See* **Dracontium gigas.**

GOETHEA (named in honour of J. W. Goethe, the celebrated German poet, 1749-1832, who was also an excellent botanist). ORD. *Malvaceæ.* A genus comprising about four species of stove evergreen shrubs, natives of Brazil. Flowers showy, nodding; peduncles axillary, one-flowered. Leaves entirely or remotely dentate. For culture, *see* **Pavonia.**

G. Makoyana (Makoy's).* *fl.* with a five-leaved epicalyx of large, cordate, ovate-acute, crimson bracts; borne in terminal clusters. *l.* shortly-stalked, elliptic, dull green, with two leafy lanceolate stipules. *h.* 2ft. 1878. (B. M. 6427.)

G. multiflora (many-flowered).* *fl.* with an epicalyx of numerous linear pink or red bracts. September. *l.* lanceolate, serrate. SYN. *Pavonia Wioti.* (B. M. 6398.)

G. semperflorens (ever-flowering). *fl.* purplish, with a white disk, usually terminal; involucre brown. *l.* elliptical, serrated at the apex. *h.* 30ft.

G. strictiflora (upright-flowered). *fl.* aggregated, axillary; bracts yellowish-white, tinged with red. August. *l.* ovate, large. *h.* 1½ft. 1852. (B. M. 4677.)

GOLD CUP. *See* **Ranunculus bulbosus.**

GOLDEN CHAIN. *See* **Laburnum vulgare.**

GOLDEN FEATHER. *See* **Pyrethrum.**

GOLDEN HAIR. A common name of **Chrysocoma Coma-aurea** (which *see*).

GOLDEN ROD. *See* **Solidago Virgaurea.**

GOLDEN SAXIFRAGE. *See* **Chrysosplenium.**

GOLDEN THISTLE. *See* **Scolymus hispanicus.**

GOLD FERN. *See* **Gymnogramme.**

GOLDFUSSIA. This genus is included, by the authors of the "Genera Plantarum," under **Strobilanthus** (which *see*).

GOLD KNOTS. *See* **Ranunculus acris.**

GOLD THREAD. A name given to the slender yellow roots of *Coptis trifolia*, an inhabitant of Canada and Siberia, where they are largely employed for dyeing skins and wool.

GOLDYLOCKS, or **GOLDILOCKS.** A common name for *Chrysocoma.* *See also* **Helichrysum Stœchas.**

GOMPHIA (from *gomphos*, a club; in reference to the shape of the fruit). Button Flower. ORD. *Ochnaceæ.* A genus comprising about eighty species of stove evergreen trees or shrubs, of which the majority are natives of South America, a few from Africa, and a very few from Asia. Flowers yellow, in terminal racemes or panicles; sepals five, coloured, imbricated; petals five, generally clawed. Leaves alternate, persistent, simple, coriaceous, shining, serrate. Gomphias thrive with similar treatment to that usually given to hard-wooded stove shrubs. A compost of two parts fibrous loam and the remainder of peat, with a small quantity of silver sand, suits them best. Propagated by cuttings of rather firm young shoots, inserted in sand, under a bell glass, in heat. The undermentioned are probably the only species now in cultivation.

G. decorans (adorned). A synonym of *G. olivæformis.*

G. olivæformis (Olive-formed).* *fl.* rich bright yellow, densely produced in large terminal branching racemes. May. *l.* shining dark green, alternate, broadly-lanceolate, 5in. long; margins serrulate. *h.* 10ft. to 15ft. Brazil, 1868. SYN. *G. decorans.* (B. M. 5262.)

Gomphia—*continued.*

G. Theophrasta (Theophrasta-like). *fl.* golden-yellow, densely produced in much-branched panicles, nearly 1ft. long. May. *l.* elongate, ovate-lanceolate, serrulate, 1ft. long, shortly stalked. South America. (B. M. 5642.)

GOMPHOCARPUS (from *gomphos*, a club, and *karpos*, a fruit; the follicles are ventricose). ORD. *Asclepiadeæ*. A genus comprising about eighty species of greenhouse herbs or sub-shrubs, natives of Southern and tropical Africa, Arabia, Central and North America. Flowers usually showy, on many-flowered, interpetiolar peduncles. Leaves opposite. The plants thrive in a compost of sandy loam and fibry peat. Propagated by seeds, sown in a hotbed, in spring; or by cuttings, made of small side shoots, when the plant is commencing new growth, and inserted in sand, under a bell glass.

G. arborescens (tree-like). *fl.*, corolla white, glabrous; peduncles, pedicels, and calyces villous. December. *l.* ovate-oblong, glabrous, with an acumen. Stem villous, branched. *h.* 4ft. to 6ft. Cape of Good Hope, 1714. Shrubby.

G. crispus (curled). *fl.* greenish-yellow; peduncles and calyces pilose. July. *l.* lanceolate-cordate, undulated, hispid. Branches downy. *h.* 1ft. to 2ft. Cape of Good Hope, 1714. Herb.

G. fruticosus (shrubby).* *fl.* white; peduncles and pedicels downy. June to September. *l.* linear-lanceolate, 4in. to 5in. long and 1in. broad. Stem downy. *h.* 5ft. to 7ft. Cape of Good Hope, 1714. The leaves of this shrub are sometimes employed to adulterate senna. (B. M. 1628.)

G. padifolius (Cherry-leaved). *fl.* axillary (not terminal), in shortly-stalked umbels of six to ten; corolla lobes purplish-green; divisions of the crown purplish-yellow. *l.* broadly cordate-ovate, sessile, decussate, in close opposite pairs, 2in. to 3in. long, acute, entire, glabrous; upper surface pale green, tinged with purple as they grow old; under surface glaucous, deeper in colour. Stem purplish-green, erect. *h.* 3ft. South Africa, 1867. Warm greenhouse herb. (Ref. B. 254.)

GOMPHOLOBIUM (from *gomphos*, a club, and *lobos*, a pod; in reference to the shape of the pod being like that of a club or wedge). ORD. *Leguminosæ*. A genus containing twenty-four species of elegant greenhouse shrubs, all from Australia. Flowers yellow or red, terminal or rarely in the upper axils, solitary or two or three together, or in short racemes. Leaves simple, or more frequently compound; leaflets usually narrow, digitate or pinnate, with the terminal leaflet sessile between the last pair; stipules small, lanceolate or subulate, or none. Gompholobiums should be grown in a compost of peat and loam, chopped into small pieces, but not sifted, with the addition of plenty of silver sand and small pieces of charcoal. Careful drainage and watering are of great importance in their culture. Propagated by cuttings, made of young shoots, about 2in. in length, during spring, inserted in sandy peat, under a bell glass, in shade.

G. aciculare (needle-shaped). A synonym of *G. tomentosum.*

G. barbigerum (bearded). A synonym of *G. latifolium.*

G. capitatum (headed). *fl.* yellow, very shortly pedicellate, in dense, terminal, leafy corymbs, almost contracted into heads; calyx usually very hirsute. July. *l.* the same as in *G. tomentosum*, or the leaflets rather more slender. *h.* 2ft. 1830. This species is closely allied to *G. tomentosum*, of which, perhaps, it is but a variety. (B. R. 1563.)

G. grandiflorum (large-flowered).* *fl.* large, solitary, or two or three together, shortly pedicellate, terminal, or on very short, axillary, leafy branches; standard broad, ¾in. long. June. *l.*, leaflets three, on a very short common petiole, narrow-linear, with a short, almost pungent point; margins revolute; veins inconspicuous. *h.* 2ft. 1803. (S. E. B. 5.)

G. grandiflorum (large-flowered). A synonym of *G. polymorphum.*

G. heterophyllum (variable-leaved). A synonym of *G. Knightianum.*

G. Knightianum (Knight's).* *fl.* pink or purple, in a short corymbose raceme, on a rather long peduncle above the last leaves; standard broad, rather longer than the calyx; wings and keel rather shorter. August. *l.* mostly pinnate, with five to eleven lanceolate or linear leaflets, obtuse or mucronate, flat, or with slightly recurved margins; stipules subulate. Stems slender, rigid, ascending or erect. *h.* 1ft. or more. 1830. SYN. *G. heterophyllum.* (B. R. 1468.)

G. lanatum (woolly). A synonym of *G. tomentosum.*

G. latifolium (broad-leaved). *fl.* golden-yellow, about 1in. long;

Gompholobium—*continued.*

vexillum large. April to June. *l.* ternate; leaflets linear, acutish. Stem erect; branches angular. *h.* 1ft. to 2ft. 1824. SYN. *G. barbigerum.* (B. M. 4171.)

G. marginatum (edged). *fl.* yellow, small, few, in irregular, loose, terminal racemes, or rarely solitary; standard about four lines long, deeply notched; lower petals scarcely exceeding the calyx. May. *l.*, leaflets three, or rarely solitary, on a common petiole, from obovate to linear-oblong, with a short sharp point, coriaceous, bordered by a thickened nerve-like edge; stipules lanceolate-subulate or setaceous. Stems slender, rigid, decumbent or ascending, under 1ft. long. 1820. (B. R. 1490.)

G. minus (smaller). *fl.* yellow. May. *l.* glabrous; leaflets three, on a very short common petiole. A much-branched shrub. SYN. *Burtonia minor.*

G. pedunculare (long flower-stalked). A synonym of *G. polymorphum.*

G. polymorphum (many-formed).* *fl.*, vexillum scarlet on the inside, with a yellow base, and purple on the outside, large; pedicels much longer than the leaves. March to August. *l.*, leaflets three to five, linear, or oblong-cuneated, mucronate, with recurved margins. Stems procumbent, weak, twining. (B. M. 1533.) SYNS. *G. grandiflorum, G. pedunculare, G. tenue* (B. R. 1615), and *G. venulosum* (B. R. 1574). *G. versicolor* is a luxuriant form, having large flowers and long leaflets (B. M. 4179; B. R. 1839, 43; P. M. B. xii. 219.)

G. tenue (slender). A synonym of *G. polymorphum.*

G. tomentosum (shaggy). *fl.* yellow, terminal, few, in compact, leafy corymbs, or rarely solitary; standard about six lines long; keel rather shorter, broad, somewhat curved, the edges minutely ciliate. May *l.*, leaflets usually five or seven, but varying from three to eleven, narrow-linear; margins revolute, so as to be almost terete, mucronate, more or less pubescent. *h.* 1ft. to 3ft. 1830. SYNS *G. aciculare, G. lanatum* (B. R. 1474).

G. venulosum (veiny-leaved). A synonym of *G. polymorphum.*

G. venustum (charming).* *fl.* purple; corymb stalked, many-flowered. April to July. *l.* impari-pinnate, with many pairs of leaflets; leaflets awl-shaped, veiny, with revolute margins, glabrous. *h.* 1ft. to 3ft. 1803. (B. M. 4258.)

GOMPHOSTYLIS CANDIDA. A synonym of **Cœlogyne maculata** (which *see*).

FIG. 123. FLOWERING BRANCH OF GOMPHRENA GLOBOSA.

GOMPHRENA (altered from *Gromphæna*, the name given by Pliny to a kind of Amaranth). Globe Amaranth. ORD. *Amarantaceæ*. A large genus (about

Gomphrena—*continued.*

seventy species) of half-hardy, annual, biennial or perennial herbs, abounding in tropical America and Australia, one species being widely dispersed through Asia and tropical Africa. Flower-heads generally sessile and solitary at the tips of the branches. Leaves opposite, sessile or shortly-stalked, entire. The common globe-flowered species is one of the prettiest hardy plants grown. It is admirably adapted for the summer decoration of greenhouses and conservatories, forming a neat, erect-branched growth of about 2ft., and a profusion of richly-coloured flower-heads. In order to retain the beauty of these for a considerable period, they should be cut previous to full maturity. For culture, *see* **Celosia.**

G. globosa (globe-flowered).* *fl.-heads* various. July. *l.* pubescent, oblong. *h.* 1½ft. India, 1714. Annual. See Fig. 123. (B. M. 2815.) Of the many varieties, *nana* is perhaps the prettiest, with flowers of a fine dark red; it rarely exceeds 5in. in height, and is usually 7in. to 8in. in diameter. Other varieties are: *alba*, *aurea superba*, *carnea*, *Isabellina*, *purpurea*, and *striata*.

G. perennis (perennial). *fl.-heads* pale yellow, two-leaved; florets distinguished by a peculiar perianth. July to October. *l.* lanceolate. *h.* 2ft. South America, 1732. (B. M. 2614.)

G. pulchella (neat). *fl.-heads* rosy, globose, smooth; involucre many-leaved; segments of staminous tube bicuspidate; peduncles elongated. July. *l.* lanceolate. *h.* 1½ft. Brazil, 1843. Annual (?). (B. M. 4064.)

GONATANTHUS (from *gonu*, *gonatos*, a knee, and *anthos*, a flower; referring to the bent spathe). ORD. *Aroideæ* (*Araceæ*). A distinct and interesting stove perennial, allied to *Colocasia*. For culture, *see* **Caladium.**

G. sarmentosus (twiggy). *fl.* very fragrant; spathe rich golden-yellow, 6in. long, crane-neck shaped; spadix about ½in. in length. May. *l.* pale green, marbled with a dark shade, very handsome. Himalaya. (B. M. 5275.)

GONATOPUS. Included, by the authors of the "Genera Plantarum," under **Zamioculcas** (which *see*).

GONGORA (named after D. Antonio Cabellero, of Gongora, once Viceroy of New Granada, and a zealous patron of Mutis). Including *Acropera*. ORD. *Orchideæ*. A singular genus, comprising more than a score species of ornamental, evergreen, stove epiphytal orchids, natives of tropical America. Flowers drooping, in racemes, sometimes 2ft. long; lateral sepals free and spreading; upper one remote and connate with the column; petals small, adnate to the middle of the column; lip clawed, continuous with the base of the column. Leaves broadly lanceolate, plaited, 1ft. or more long. Pseudo-bulbs oblong, two-leaved. Gongoras should be grown in baskets of peat and moss, and with the temperature of a cool end of the Cattleya house. A liberal supply of water, both to leaves and roots, may be applied during summer. During winter, little will be required, but the pseudo-bulbs must not be allowed to shrivel. This genus, although somewhat neglected of late, possesses several free-flowering and handsome species, of which the following are a selection:

G. armeniaca (Apricot-coloured). *fl.* rich yellow, slightly spotted with red; raceme rather lax, twelve to twenty-flowered, pendulous, 1ft. or more long. Summer. *l.* twin, broad, light green, produced on the top of the oval pseudo-bulbs. Nicaragua, 1850.

G. atropurpurea (dark-purple). *fl.* dark purple, borne in great profusion; racemes long. Summer. *l.* light green. Pseudo-bulbs ribbed. Trinidad, 1824. An old but very pretty species, of compact growth. (B. M. 3220.)

G. bufonia major (large frog-like). *fl.* elegantly variegated with purple and white. Brazil, 1837. This species much resembles *G. atropurpurea* in habit, leaves, and pseudo-bulbs.

G. Galeottiana (Galeotti's). *fl.* red, yellow. April. Mexico, 1842.

G. maculata (spotted).* *fl.* yellow, spotted with rosy-red; racemes more than 1ft. long, pendulous. May. *l.* dark green. Pseudo-bulbs ribbed. *h.* 1½ft. Demerara, 1832. (B. M. 3687.) There are, or were, numerous varieties of this species, one of the best being *grandiflora*, in which the flowers are pure white, with a few rosy spots on the lip, and the pseudo-bulbs more deeply ribbed than in the type. Guiana, 1836.

Gongora—*continued.*

G. portentosa (monstrous). *fl.* 1½in. to 2in. long; sepals pale flesh-coloured; petals and lip speckled with small violet-purple spots; raceme elongated, many-flowered. April. Ecuador, 1869. A pretty compact-growing species. (B. M. 6284.)

G. speciosa (showy). A synonym of *Coryanthes speciosa*.

GONIOPHLEBIUM. *See* **Polypodium.**

GONIOPTERIS. *See* **Polypodium.**

GONOCALYX (from *gonos*, an angle, and *calyx*; in allusion to the angled calyx). ORD. *Vacciniaceæ*. The only species of this genus is the one described below; it is a charming cool-house bushy evergreen, from New Grenada. For culture, *see* **Thibaudia.**

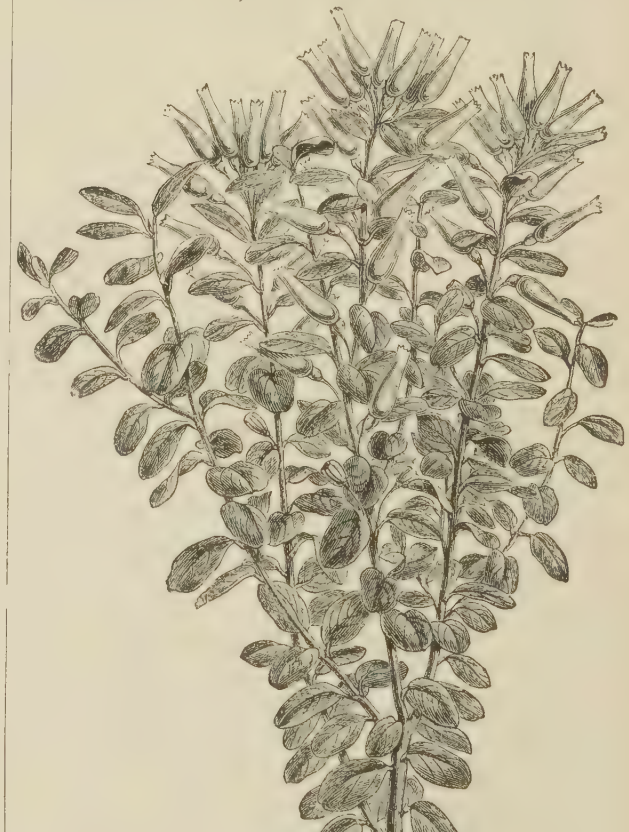


FIG. 124. GONOCALYX PULCHER.

G. pulcher (beautiful). *fl.* deep bright red, white; corolla tubular. Spring. *l.* shortly stalked, nearly round, small, obtuse, tinted with rose-purple when young, bright green when old. See Fig. 124.

GONOLOBUS (from *gonia*, an angle, and *lobos*, a pod; in reference to one of the original species having costate-angled follicles). ORD. *Asclepiadeæ*. A genus containing about seventy species of stove, greenhouse or hardy, twining or prostrate, shrubs or sub-shrubs, natives of tropical and North America. Flowers dull or dark-coloured, in racemes or corymbs; peduncles interpetiolar; corolla rotate or reflexed, spreading; limb five-parted. Leaves opposite, very often cordate. The greenhouse and stove species thrive, with ordinary treatment, in a compost of loam and peat. Cuttings will root readily in sand, under a glass. The hardy sorts require a light sandy soil, and a warm dryish situation; and may be increased by divisions or by seeds.

Gonolobus—*continued.*

G. carolinensis (Carolina).* *fl.* purplish, umbellate; segments of corolla oval-oblong, bluntish. June and July. *l.* ovate-cordate, acuminated, downy, on longish petioles. Stem and petioles hairy. Carolina, 1824. Greenhouse deciduous. (S. B. F. G. 1.)

G. Cundurango (Condor Vine). The correct name of this plant is **Marsdenia Cundurango** (which *see*).

G. diadematus (diademed). *fl.* green; crown at bottom of tube. September and October. *l.* oblong, elliptical, lanceolate, cordate. Mexico, 1812. Stove. (B. R. 252.)

G. lævis (smooth). *fl.* green; umbels many-flowered; corolla rather elongated-conical in the bud, not twisted; lobes narrowly or linear-lanceolate, obtuse, glabrous inside. June. *l.* oblong-cordate, with a deep and narrow but open sinus, conspicuously acuminate. North America, 1806. Hardy herbaceous. There is a variety, *macrophyllus*, with broadly-cordate leaves, and with the rounded basal lobes approximate or even overlapping.

G. niger (black). *fl.* black, or very dark purple; racemes few-flowered. October. *l.* ovate-cordate, acute. Mexico, 1825. Stove evergreen. (B. M. 2799.)

G. obliquus (oblique). *fl.* in umbels, sometimes cymosely compound or geminate; corolla in the bud oblong-conical; lobes crimson-purple inside, dull or greenish and minutely pubescent outside. Summer. *l.* from rounded to ovate-cordate, with a narrow sinus, abruptly acuminate. North America, 1809. Hardy. SYN. *Cynanchum discolor* (under which name it is figured in B. M. 1273.)

G. suberosus (sub-erose). *fl.*, umbels three to nine-flowered, much shorter than the petiole; corolla broadly conical, and with abrupt acumination, twisted in the bud; lobes ovate, or becoming triangular-lanceolate, acute, of thickish and firm texture. Summer. *l.* cordate, with an open and shallow, or sometimes deeper and narrow, sinus, acuminate, minutely pubescent, glabrate, or sometimes hairy. North America, 1732. Hardy. SYN. *Cynanchum suberosum.*

GONOSTEMON. Included under **Stapelia.**

GOODENIA (named in honour of Dr. Samuel Goodenough 1743-1827, Bishop of Carlisle, author of a monograph of the genus *Carex*, published in the "Linnæan Transactions"). ORD. *Goodenovieæ.* A genus containing about seventy species of greenhouse herbs or sub-shrubs, rarely shrubs, limited to Australia. Flowers yellow, purplish, or blue; peduncles either axillary or in terminal racemes or panicles. Leaves alternate or radical. Goodenias thrive in a compost of peat and loam. Propagated by cuttings, which root freely under a bell glass, during spring. The species described below are those usually seen in cultivation.

G. grandiflora (large-flowered). *fl.* yellow, more or less streaked with purple, large; corolla glabrous or slightly pubescent outside; peduncles axillary, one-flowered. July. *l.* petiolate, from broadly ovate to ovate-lanceolate, truncate or cordate at the base, toothed. *h.* 3ft. to 4ft. 1803. Herbaceous. (B. M. 890; B. R. 1845, 29.)

G. lævigata (smooth). A synonym of *Scævola microcarpa.*

G. ovata (ovate). *fl.*, corolla yellow, glabrous outside; peduncles axillary, often two together or forked near the base, slender and often several-flowered. July. *l.* petiolate, from ovate to broadly lanceolate, or the lower ones sometimes almost orbicular-cordate, denticulate, 1in. to 2in. long. *h.* 2ft. to 4ft. An erect, glabrous, often somewhat viscid shrub or under-shrub. (A. B. R. 68.)

G. stelligera (star-haired). *fl.* yellow, sessile or nearly so, in clusters of two or three, the upper ones solitary, in a long, interrupted spike; corolla densely villous outside. June. *l.*, radical ones linear, or slightly linear-acute, obtuse, rather thick, entire; stem ones very few, and much shorter; floral ones reduced to linear bracts. Stems erect, almost leafless. *h.* 1ft. to 1½ft. 1823. Perennial.

G. tenella (tender). A synonym of *Velleia trinervis.*

GOODENOVIEÆ. A natural order of herbs, sub-shrubs, or rarely shrubs, the juice not milky. Flowers hermaphrodite, axillary or in terminal spikes, racemes, or panicles, the primary inflorescence centripetal, the secondary usually cymose and dichotomous; corolla yellow, blue, or white, rarely red or purple. Leaves alternate or radical, very rarely irregularly opposite, entire, toothed, or rarely pinnatifid. The order is almost exclusively Australian, a few species only of one genus (*Scævola*) being known from New Zealand, the Pacific Islands, and the coasts of tropical and sub-tropical Africa, Asia, and America; and one of another genus (*Calogyne*), perhaps not different from an Australian one, extending to the coast of China. There are about twelve genera and two hundred species. Good examples are: *Dampiera, Goodenia, Leschenaultia, Scævola,* and *Velleia.*

GOODIA (named in honour of Peter Good, a botanical collector, who was employed in collecting seeds in Australia, where he died). ORD. *Leguminosæ.* A genus containing two species of ornamental greenhouse evergreen shrubs, natives of Australia. Flowers golden-yellow, like those of *Laburnum*, but smaller; calyx two-lipped, the lips not deeply divided; stamens all united in a sheath. Leaves pinnate, trifoliolate; leaflets entire. Goodias thrive in a compost of sandy peat and fibry loam. Propagated by seeds, which usually ripen in abundance; or by cuttings, made of the young shoots, during spring, and inserted in sand, under a bell glass.

G. lotifolia (Lotus-leaved).* *fl.* yellow, but with the base of the vexillum red. April to July. *l.*, leaflets obovate, smooth. *h.* 2ft. to 4ft. 1733. (B. M. 958; L. B. C. 696.)

G. pubescens (downy).* *fl.* yellow, spotted with red. Summer. *l.*, leaflets obovately-cuneated, pubescent. Branches and peduncles rather hispid. *h.* 1ft. to 3ft. 1803. (B. M. 1310.)

GOOD KING HENRY. *See* **Chenopodium Bonus-Henricus.**

GOODYERA (named in honour of John Goodyer, a British botanist, who assisted Johnson in his edition of "Gerard's Herbal"). SYNS. *Peramium, Tussacia.* ORD. *Orchideæ.* A genus of about twenty-five species of hardy, greenhouse, or stove terrestrial orchids, with flower-spikes issuing from the centre of the foliage, and thick, fleshy roots. Some species have their dark, velvet-like foliage marked like that of some Anœctochili. The greenhouse and stove sorts thrive best in small pots or shallow pans, in a compost of well-drained peat and sand, with a little loam; and require a liberal supply of water when in a growing state. Propagated by cuttings, taken with a piece of root to each, inserted in similar soil to that already mentioned, and placed under a bell glass. The hardy species should be grown in a shady position, and in moist, peaty soil, with which soft sandstone may be incorporated. The best species is undoubtedly *G. discolor.*

G. cordata (heart-shaped). *fl.* yellowish-brown; racemes usually several-flowered. September. *l.* few, oblong-acute, usually cordate at the base. Stem upright. India, 1840. Stove. SYN. *Georchis cordata.*

G. discolor (two-coloured).* *fl.* pure white, with a lemon-yellow blotch on the lip, which is curiously twisted or contorted; spikes numerous, erect, about 10in. high, remaining a considerable time in perfection. Winter. *l.* 2in. long, 1in. broad, rich dark velvety-green, with interrupted longitudinal white stripes, more or less distinct. South America, 1815. Greenhouse. (B. M. 2055.)

G. Dominii (Dominy's). *l.* larger than those of *G. discolor*, with a dark, bronzy, velvet-like appearance, and lightish longitudinal lines. A very handsome garden hybrid. Stove.

G. macrantha (large-flowered).* *fl.* pale rose, large, two or three at the ends of the shoots. June. *l.* ovate, acute, bordered with yellow; central parts dark green, reticulated with pale green lines. Japan, 1867. This pretty plant is nearly hardy. SYN. *G. picta.* (G. C. 1867, 1022.)

G. picta (painted). A synonym of *G. macrantha.*

G. pubescens (downy).* *fl.* white. July. *l.* green, delicately veined with silver. *h.* 3in. North America, 1802. A very pretty little species, suitable for growing either in a cool house or pit, a cool fernery, or out of doors; in the latter case, it thrives best when planted under evergreen shrubs, in deep shade, and in a compost of peat and leaf mould. There is a pretty form of this, *minor* (figured in B. M. 2540).

G. repens (creeping). *fl.* white, with a sweet scent; spike spiral, secund. July. *l.* ovate, dark, evergreen. *h.* 6in. Northern hemisphere (Britain). This species thrives well in a leaf mould, in deep shade. (Sy. En. B. 1475.)

G. rubicunda (reddish). *fl.* reddish. July. *l.* velvet-like, with three longitudinal bands of red down each leaf. Manilla, 1838. Stove. SYN. *G. rubrovenia.*

G. rubrovenia (red-veined). A synonym of *G. rubicunda.*

G. Veitchii (Veitch's).* *l.* rich deep reddish-brown, with a few silver ribs. A vigorous hybrid between *G. discolor* and *Anœctochilus Veitchii.* Stove.

G. velutina (velvety).* *fl.* white, shaded with rose or salmon; spike usually ten-flowered, terminal. *l.* ovate, acute, deep velvety, purplish-green, with a well-defined white costa. Japan, 1867. A very pretty, nearly hardy plant. (R. G. 533.)

GOORA NUT. *See* **Cola acuminata.**

GOOSEBERRY (*Ribes*). The Gooseberry is a hardy deciduous shrub, native of various parts of Europe, including Britain, where it is either indigenous or has been introduced at an early period, and become naturalised. Its cultivation is neglected in France, Italy, Spain, and Southern Europe, but is much practised in Britain, where the fruit has been highly esteemed since the time of Henry VIII., and is still one of the most popular grown. Plants, under favourable conditions, are recorded as having attained an age exceeding forty years. Two remarkable ones are stated to have been growing about the year 1821, against a wall in the garden of the late Sir Joseph Banks, at Overton Hall, each measuring upwards of 50ft. from one extremity of the branches to the other. Gooseberries succeed well in the North of England and Scotland, and the fruits attain a higher flavour in these parts, where the temperature is moderate and comparatively cool, than in the hotter climate of the South, where they frequently become prematurely ripened by scorching sun and an insufficiency of moisture. In Lancashire, Cheshire, and neighbouring counties, the raising of Gooseberries has received special attention; more, perhaps, by encouragement offered for very large fruits, than for their superior quality when ripe. These large-fruited varieties are, however, valuable in a green state for cooking, being sufficiently grown for the purpose before the smaller sorts, which are, as a rule, of the highest flavour when gradually and properly ripened. The crop is a valuable and usually remunerative one in the neighbourhood of large towns, where there is a demand for the fruit, both in a green and ripened state. It is one of the earliest in use for cooking, bottling, or preserving when green, and, when ripe, a selection of varieties and a cool aspect, will ensure a supply for dessert from an early season until late in the autumn. Although the bushes are quite hardy, the leaves and tender young fruits are very liable to destruction by late spring frosts, if these suddenly happen after a spell of mild weather.

Propagation may be readily effected by seeds, cuttings, layers, or suckers. The first method is only adopted with a view to raising new varieties, as none of those existing reproduce themselves true from seed; neither will the product be restricted to fruit of the same colour as that from which the seeds were collected. If any are required, they should be washed from the ripe fruit, merely dried on sheets of paper, and then sown in the open ground, afterwards covering with about 1in. of light soil. The young seedlings will be ready for transplanting the following autumn, and will usually require about three years' growth before fruiting. Propagation by cuttings is the mode generally practised, and it is one that is tolerably certain, if the cuttings are healthy and properly put in. Strong, well-ripened shoots should be selected, and taken off, if possible, at their junction with the older wood. The tops will require shortening to make the cutting about 1ft. long, and all eyes must be carefully removed from the lower half before placing in the soil. Early autumn is the best time for this operation. An open piece of moist ground should be selected, and the cuttings inserted thickly in trenches 4in. deep, the soil being then filled in and evenly trodden, and other lines cut out in a similar way, about 1ft. apart. Under this treatment, plenty of time is allowed the cuttings to callus before spring, and good plants, ready for training in any form desired, will be available the following year. Layering is a certain method for increasing any variety in summer, by pegging the branches down, and covering them with some light soil. Large branches, or merely their tops, may thus be successfully rooted and removed to permanent positions the same season. Such plants are not so symmetrical as others raised from cuttings; but the method is useful for the perpetuation of scarce varieties. Suckers have the disadvantage of continually increasing themselves in a similar way from the

Gooseberry—*continued.*

base. They are objectionable on this account, as it is difficult to keep all the eyes removed from the part which is under ground.

Cultivation, Site, &c. The Gooseberry thrives in any good garden soil that is of a moist, rather than dry, character, and not sufficiently heavy to cake hard in dry weather. For growing specially fine fruit, a rich loamy soil, with plenty of decayed manure, should be prepared, and plenty of water supplied throughout the summer. An open situation is best for giving the highest flavour to ripe fruit; but, if too much exposed to easterly or other cold winds in spring, there is a danger of much injury being caused to the crop thereby. In the hottest parts of the country, the bush form is the best for the open quarter, as the branches then help to shade each

FIG. 125. FRUITING BRANCH OF GOOSEBERRY.

other, and protect the fruits that hang underneath (see Fig. 125) from scorching sunshine, which tends to prematurely ripen them. For an autumn supply for dessert, late varieties should be planted in a north border, or trained on a wall with that aspect, and protected from birds. Such plants are, as a rule, more likely to escape injury from spring frosts, as early growth is not encouraged, on account of the absence of sun on the plants. In planting bush trees in the open quarter, a distance of about 6ft. apart should be allowed, and the plants in each line placed opposite the angles formed by those in the preceding one. The intervening space may at first be partly occupied by some other crop until the Gooseberries are established. The latter should have the soil removed a little with a fork each autumn, and a dressing of manure applied round the stems. In the more northern parts of the country, a southern aspect, with exposure to sunshine, is most suitable, such as a position afforded by planting and training the trees thinly as espaliers. A number of sorts are naturally of a pendent habit, and are, consequently, best adapted for growing in the bush form. In districts like Lancashire, where very large fruits are grown, a special system of culture is adopted to attain that end, by planting in prepared soil, watering the roots, and placing, for a supply of moisture, saucers full of water under the limited number of fruits retained after severe thinning-out has been practised. This is only a means adopted for special purposes, to obtain large specimens, and it is generally conducted at the expense of high flavour. Where there is a prodigious crop, it is advisable, so soon as safety from frost is insured, to thin out some for use in the younger stages.

Pruning and Training. Gooseberries required for bushes in an open quarter should have a clear stem above

Gooseberry—*continued.*

ground of about 6in., to admit of the soil being hoed and forked underneath. If, on replanting the first year after inserting the cuttings, three shoots can be obtained at this height, they should be shortened to three or four eyes each. The following summer, two new shoots should be secured from each, and the laterals kept stopped for forming spurs, the main branches being cut back to about 1ft. the next autumn, and these, in due course, allowed two more each; this being sufficient to form, if evenly regulated, what is considered a perfect tree. Some of the pendulous varieties require propping with forked sticks, to keep the branches and fruit off the ground; others, of an erect, vigorous habit, may require tying down. In the annual pruning of established trees, the spurs should be preserved, and strong, well-ripened shoots of the previous summer retained, so far as practicable, to replace old wood, which does not bear fine fruit. Although plenty of room must be allowed each branch for the admission of light and air, it is not well to have them too thin in southern localities, on account of the shade from sunshine afforded the fruit by the leaves. When planted to cover north walls, the fan system of training may be adopted, and part of the old wood annually replaced; or the plants may be inserted, when young, 3ft. apart, and three shoots conducted from each at equal distances perpendicularly, afterwards pruning, in summer, with a view to limiting the production of fruit from spurs. Gooseberries succeed well in such a position; and if dessert varieties of good constitution are planted, and the necessary protection from birds, &c., is afforded, a supply may be secured much later than from the open ground.

Insects, &c. The Gooseberry suffers severely from the ravages of several destructive insects, which feed on the leaves so far as to entirely defoliate the trees. The principal depredators are the caterpillars of the Magpie Moth (*Abraxas grossulariata*) and of *Phalœna Vanaria*, and the larvæ of the Gooseberry and Currant Sawfly (*Nematus Ribesii*). Hand-picking, persistently practised from the first appearance of the insects, is the most certain cure; but this is almost impossible in extensive collections. Bushes situated near much-frequented walks, or placed under protection from birds, have been observed to become more infested than others fully exposed. This infers that birds of some sort, although it is doubtful which, either eat the insects or carry them away to feed their young. Cuckoos are considered special friends for this purpose; and sparrows, sparrow-hawks, and tomtits, have also been observed to visit the bushes frequently when infested with caterpillars; but whether for eating them or not, is somewhat uncertain. Lightly syringing the bushes, in the evening, with water, and then dusting with lime or flowers of sulphur, also scattering some of each and some soot round the plants, are means usually adopted as remedies. As most of these insects undergo their transformation in a young state, on or beneath the ground, various methods for destroying them there have been recommended, such as occasionally dusting with newly-slaked lime or Hellebore powder; or covering the soil, in spring, to a depth of 3in., with fresh tan. Great destruction is frequently caused to Gooseberries in some localities by birds, particularly bullfinches, picking out the buds in spring, and also devouring the fruit when ripe. A limited number of trees may be covered with netting; but, in a large collection, it is difficult to stop these attacks, when once begun.

Sorts. Gooseberries are divided into classes that are distinguished from each other by the colour of the fruits and the absence or presence of hairs on the skins. Varieties in each colour are very numerous, many of the smaller fruits being of the highest flavour, while the larger ones are fit for cooking earlier in the season. Those having red skins are variable in flavour, a large

Gooseberry—*continued.*

quantity being more or less acid. On account of their late-keeping properties, the best red sorts are most valuable for dessert fruit in autumn, after the majority of the others are past. The highest flavour is attained in the amber and yellow varieties, which are very tender in the skin, and mostly early in ripening. Many of the green ones are large, and contain but little pulp in proportion. Others of the same colour are small, but remarkably thin-skinned and rich in flavour when ripe. Amongst white sorts, there are several of good quality, but they are not so generally cultivated as the others. Subjoined is a selection from the leading varieties in each class. Those marked F, are specially recommended for flavour; and others marked S, for size.

Class I. Fruit with Red Skin.

Conquering Hero (S). Fruit dark red, very long and large, a little hairy. Branches slender, large, and spreading.

Crown Bob. Fruit bright red, of good flavour, roundish-oblong, hairy. Branches pendulous.

Dan's Mistake (S). Fruit light red, very large, hairy. Branches strong, erect. Useful variety for exhibition.

Dr. Hogg (F). Fruit purplish-red, long, broad, downy. Branches short-jointed, erect, vigorous.

Henson's Seedling. Fruit deep red, medium, of good flavour, very hairy; late. Branches erect. An abundant bearer.

Ironmonger (F). Fruit dark red, small, hairy. Branches spreading. Often confounded with, but inferior to, Red Champagne. SYN. Hairy Black.

Keen's Seedling (F). Fruit bright red, medium, oblong, very hairy; early. Branches pendulous. Great bearer.

Lion's Provider. Fruit light red, long, a little hairy. Branches long, slender, erect.

London (S). Fruit dark red, very large, roundish-ovate, smooth. Branches pendulous. A rather tender and uncertain bearer, but the largest gooseberry known.

Miss Bold (F). Fruit light red, medium, very downy; early. Branches spreading.

Monarch. Fruit deep red, very large, oblong, hairy. Branches strong, erect. A good bearer.

Plough Boy. Fruit light red, shaded yellow, very long, smooth; late. Branches slender, spreading.

Raspberry (F). Fruit dark red, small, hairy; early. Branches spreading, pendulous.

Red Champagne (F). Fruit light red, small, roundish-oblong, hairy. Branches very erect. A good bearer. SYNS. Countess of Errol and Ironmonger of Scotland.

Red Turkey. Fruit dark red, small, obovate, smooth; late. Branches somewhat erect.

Red Warrington (F). Fruit red, roundish-oblong, hairy; late, hangs well in autumn. Branches pendulous. One of the best for general cultivation. SYNS. Aston Seedling, Volunteer.

Rifleman. Fruit red, very large, roundish, hairy. Branches erect. A good bearer.

Rough Red (F). Fruit dark red, small, very hairy; early Branches upright, spreading.

Wilmot's Early Red. Fruit dark red, large, smooth. Branches pendulous.

Wonderful (S). Fruit purplish-red, very large, smooth. Branches short-jointed, stiff, very tender in spring.

Class II. Fruit with Yellow Skin.

Broom Girl (F). Fruit large, with long stalk; skin dark yellow, hairy; early and first rate. Branches strong, erect.

Catherina (S). Fruit yellow, very large, obovate, slightly hairy. Branches slender, spreading.

Criterion. Fruit greenish-yellow, medium, a little hairy. Branches spreading, pendulous.

Drill (S). Fruit greenish-yellow, large, long, smooth; late. Branches spreading.

Early Sulphur (F). Fruit bright yellow, medium, very hairy; early and abundant. Leaves pubescent above. Branches erect.

Fanny. Fruit pale yellow, large, round, hairy. Branches erect.

Garibaldi (S). Fruit pale yellow, large, long; skin hairy. Branches spreading, pendulous.

Gipsy Queen (F). Fruit pale yellow, large, smooth; early. Branches slender, pendulous.

High Sheriff. Fruit deep yellow, large, round, very hairy. Branches spreading, pendulous.

Gooseberry—*continued.*

Leader (F). Fruit greenish-yellow, medium, of rich flavour, smooth; early. Branches spreading.

Leveller (S). Fruit greenish-yellow, very large, long, smooth. Branches spreading. An excellent bearer.

Lord Rancliffe. Fruit pale yellow, medium, round, hairy. Branches straight, spreading.

Moreton Hero (F). Fruit pale yellow, large, oval, smooth; skin thin. Branches free, spreading.

Mount Pleasant (S). Fruit deep yellow, long, hairy; late. Branches vigorous, spreading.

Peru (S). Fruit pale yellow, large, tapering, slightly hairy. Branches spreading, pendulous.

Rumbullion. Fruit pale yellow, small, very downy; early; much cultivated for bottling. Branches erect.

Smiling Beauty (F). Fruit yellowish-white, large, oblong, quite smooth; early. Branches pendulous.

Sulphur. Fruit yellow, small, roundish, hairy, and of good flavour; rather late. Branches erect. SYN. Rough Yellow.

Yellow Ball (F). Fruit yellow, medium, thick-skinned, smooth. Branches erect.

Yellow Champagne (F). Fruit small, of rich flavour, hairy; late. Branches erect. One of the best yellows. SYN. Hairy Amber.

Class III. Fruit with Green Skin.

Glenton Green (F). Fruit medium, oblong, with very hairy, thick skin. Leaves pubescent above. Branches pendulous.

Green Gascoigne (F). Fruit deep green, small, round, hairy; early. Branches erect. Free bearer.

Green London (S). Fruit bright green, medium, smooth. Branches short-jointed, spreading.

Green Overall (F). Fruit dark green, of good flavour, medium size, smooth. Branches spreading. An excellent variety.

Green River. Fruit deep green, smooth, medium, oval. Branches spreading.

Green Walnut (F). Fruit dark green, smooth, medium, obovate; skin thin; early. Branches long, spreading. SYNS. Nonpareil, Smooth Green.

Gregory's Perfection. Fruit green, downy, large, round. Branches pendulous. Good late variety.

Heart of Oak (F). Fruit smooth, large, oblong; skin green, with yellowish veins; footstalk thick, tapering into the fruit. Branches pendulous.

Hebburn Prolific (F). Fruit medium, roundish, hairy. Branches erect. An early and abundant bearer.

Jolly Anglers. Fruit large, oblong, of good quality, downy; late. Branches erect.

Keepsake. Fruit green, large, smooth, sometimes a little hairy; ripens early. Branches vigorous, pendulous.

Laurel. Fruit pale green, downy, large, obovate; late. Branches erect. An abundant bearer. SYN. Green Laurel.

Lord Eldon (F). Fruit dark green, smooth, round, very rich flavour; early. Branches slender, spreading.

Pitmaston Greengage (F). Fruit small, obovate, smooth, of rich flavour; hangs well. Branches erect.

Random Green (F). Fruit deep green, smooth, large, of good flavour. Branches spreading. A good bearer.

Roseberry (F). Fruit large, round; skin dark-green, smooth. Branches vigorous, erect. A very productive and good variety.

Shiner (S). Fruit very large, round, smooth, one of the largest gooseberries grown. Branches spreading.

Stockwell. Fruit bright green, long, smooth. Branches slender, spreading.

Telegraph (S). Fruit large, long, smooth; late. Branches short-jointed, spreading.

Thumper (S). Fruit large, flat-sided, smooth, of good flavour; late. Branches pendulous.

Thunder (F). Fruit large, roundish, hairy, of excellent flavour; early. Branches short-jointed, erect.

Class IV. Fruit with White Skin.

Abraham Newland (F). Fruit white, large, oblong, slightly hairy, rich-flavoured; late. Branches erect.

Adams's Snowball. Fruit medium, roundish; skin hairy. Branches pendulous.

Antagonist (S). Fruit creamy-white, very large, long, hairy, of good flavour. Branches spreading. A heavy cropper, and the largest white gooseberry grown.

Bright Venus (F). Fruit medium, obovate, slightly hairy; hangs well. Branches erect.

Careless (S). Fruit creamy-white, large and long, smooth, very handsome. Branches slender, spreading. An abundant bearer.

Cheshire Lass. Fruit large, oblong, downy, of rich sweet flavour. Branches erect. Very early, and a good bearer.

Gooseberry—*continued.*

Crystal (F). Fruit small, roundish, smooth. Branches spreading, pendulous. A valuable late variety.

Early White (F). Fruit roundish-oblong, downy, of rich flavour; skin thin; very early. Branches spreading.

Hero of the Nile (S). Fruit greenish-white, large, smooth. Branches spreading.

King of Trumps (F). Fruit roundish-oblong, slightly hairy, of good flavour. Branches slender, spreading.

Lady Leicester (S). Fruit large; skin whitish, with green veins, hairy; early. Branches spreading.

Mayor of Oldham (F). Fruit greenish-white, round, smooth, of excellent flavour. Branches spreading.

Princess Royal. Fruit large, obovate, hairy, of good flavour Branches pendulous. A good bearer.

Queen of Trumps (S). Fruit long, flat-sided, smooth, large, and of excellent flavour. Branches vigorous, spreading.

Royal White. Fruit small, round, slightly hairy. Branches erect.

Snowdrop (F). Fruit very large, roundish, of excellent flavour; skin white, with broad green veins, hairy. Branches slender, spreading. One of the best grown.

White Champagne (F). Fruit small, roundish, sweet and rich. hairy. Leaves pubescent above. Branches erect.

White Fig. Fruit small, obovate, smooth; will hang till it shrivels Branches erect.

White Lion. Fruit large, obovate, slightly hairy, rich flavour Branches pendulous. Very late variety

Woodward's Whitesmith (F). Fruit white, downy, large, roundish-oblong, of excellent flavour. Branches erect. Rather early, an abundant bearer, and one of the best in cultivation. SYNS. Hall's Seedling, Lancashire Lass, Sir Sidney Smith, &c.

GOOSEBERRY AND CURRANT SAWFLY (*Nematus Ribesii*). This is a well-known enemy to the gardener, from the damage the larvæ do to Gooseberry and Currant bushes, completely stripping them of their leaves. The eggs are laid in spring, on the under side of the newly-expanded leaves, and are hatched in a few days. The caterpillars are of a peculiar bluish-green colour, with black spots on the segments and yellow markings by the head and tail. They have as many as twenty legs. When full grown, they descend into the earth, and either at once assume the chrysalid state, and thence become perfect flies, or else hibernate till the following spring, before making their final changes. The following are a few of the remedies given for the extermination of the pest:

Tobacco Powder. This, dredged over the bushes, at night and early in the morning, will dislodge the worms, and they can be trodden on or picked up by hand and destroyed.

Soot and Lime. Equal parts of dry soot and air-slaked lime, mixed together, and dusted over the foliage whilst in a damp state, and when the caterpillars are small, will help to keep the plants clear. When the leaves are fallen, they should be raked together and removed or burnt. A good dressing of soot and lime must then be applied to the ground, which should not be dry at the time, and the same operation should be repeated in spring.

Hellebore. Freshly-ground White Hellebore, dusted over the trees while the foliage is damp, is a certain exterminator of the caterpillars. The following recipe is equally efficacious: Dissolve 1lb. of size in a gallon or two of hot water, and to this add 1lb. of Hellebore powder. When the water becomes nearly cold, mix thoroughly, and add enough cold water to make about sixteen gallons. Apply with a water-pot or syringe. At the end of a week, thoroughly wash off with clean water, as the powder is poisonous.

GOOSEBERRY OR MAGPIE MOTH (*Abraxas grossulariata*). This common and familiar moth (see (Fig. 126) is often mistaken for a butterfly. It usually appears about the middle of summer, and continues until autumn. Its wings have a white background, with numerous patches of black, varying much in size. At the base of the forewings is a yellow patch, and

Gooseberry or Magpie Moth—*continued.*

near the middle a band of yellow, between two rows of black spots. The colouring is, however, very variable. In the male, the antennæ are very slightly feathered, while in the female they are thread-like. The female deposits her eggs singly on the leaves of Gooseberry or Black Currant bushes, generally towards evening; and the fact that the eggs are so thoroughly distributed by the moth, sufficiently explains, apart from its mere fecundity, how the caterpillars are so difficult to eradicate. The eggs soon hatch, and the larvæ feed for from two to three weeks, and then lie secure within the folds of Gooseberry or Currant leaves, and pass a sort of torpid state of existence. When the

FIG. 126. GOOSEBERRY OR MAGPIE MOTH.

winter is past, the caterpillar emerges from its temporary lodging, and again sets about the process of eating. The grub, when full grown, is white and orange, with some conspicuous black bands at each joint. The chrysalis is of a black colour, having a few orange rings round the segments of the body. The caterpillars of this pretty moth are exceedingly destructive, and will soon defoliate a very large space, especially if the trees are on walls. Hand-picking is very practicable, the caterpillars being conspicuous. Toads and birds will also take them; but damage will be prevented by seasonable precautions. For remedies, *see* **Gooseberry and Currant Sawfly.**

GOOSE FOOT. A common name of **Chenopodium** (which *see*).

GORDONIA (named in honour of Alexander Gordon, a nurseryman contemporary with Philip Miller). Including *Polyspora*. ORD. *Ternstrœmiaceæ*. A genus comprising ten species of greenhouse or hardy trees, natives of North America, and of tropical and sub-tropical Asia. Flowers often showy; peduncles solitary, one-flowered. Leaves evergreen, entire or crenate. The hardy species are very handsome, and deserve careful culture; they thrive in a moist peat, or leaf mould and sand. The greenhouse species succeed in a similar compost, with ordinary treatment. Propagated by layers, or by imported seeds.

G. anomala (anomalous).* *fl.* cream-coloured, sessile, solitary, usually axillary. November. *l.* obovate-oblong, serrulated; upper ones entire. *h.* 3ft. Tropical and sub-tropical Asia, 1816. Greenhouse. (B. M. 4019, under name of *Polyspora axillaris.*)

G. grandis (great). *fl.* white, large; corymbs few-flowered, terminal. 1880. A very handsome greenhouse species, with leaves somewhat like those of the Cherry Laurel.

G. javanica (Javan). A synonym of *Schima Noronhæ.*

G. Lasianthus (hairy-flowered).* *fl.* white, 4in. across, fragrant; pedicels axillary. July and August. *l.* oblong, smooth, serrated, coriaceous. *h.* 8ft. to 10ft. (in England). North America, 1739. Hardy. (B. M. 668.)

G. pubescens (downy).* *fl.* white, with yellow filaments, fragrant, almost sessile, 3in. across; petals and sepals rather silky on the outside. August. *l.* obovate-lanceolate, pubescent beneath, somewhat serrated, membranous. *h.* 4ft. to 6ft. (in England). North America, 1774. Hardy.

GORSE. *See* **Ulex europæus.**

GOSSYPIUM (the Latin name used by Pliny). Cotton Plant. ORD. *Malvaceæ*. A small genus (comprising three species) of stove perennial herbs or shrubs.

Gossypium—*continued.*

Flowers yellow or purple, usually large and showy; calyx truncate or shortly five-fid. Fruit a three or five-celled capsule, bursting when ripe, and exposing the numerous seeds covered with down. Leaves three to nine-lobed, or rarely entire. Gossypiums thrive in a light rich soil. Propagated by seeds, sown in moist heat, in spring. The seedlings, when large enough to handle, should be planted singly in small pots, and transferred to larger ones as required. This genus is one of the most important of the whole vegetable kingdom, yielding, as it does, the well-known cotton of commerce.

G. Bahma (Bahma). This differs from other Cottons in its larger size, and its erect, almost unbranched habit. More cotton, too, is produced by it. Originated in Egypt, several years ago; said to be a hybrid between Egyptian Cotton and *Hibiscus esculentus.* (G. C. n. s., vii. 561.)

G. barbadense (Barbadoes). *fl.* yellow, with a purple spot at the base of each petal, finally turning reddish, large. September. *l.*, upper ones three-lobed; lower ones five-lobed. Stem smooth. *h.* 5ft. Barbadoes, 1759. (B. R. i. 84.)

G. herbaceum (herbaceous). *fl.* yellow, with a purple spot on the claw of each petal. July. *l.* five-lobed; lobes rounded, mucronate. *h.* 3ft. to 4ft. East Indies, 1594.

GOUANIA (named in honour of Anthony Gouan, 1733-1821, Professor of Botany at Montpelier). SYN. *Retinaria.* ORD. *Rhamneæ*. A genus containing about thirty species of usually evergreen stove scandent shrubs, of botanical interest only. They are natives of the forests of tropical America, Asia, and Africa. Flowers small, usually produced in clusters along leafless branches, forming slender spikes. Leaves alternate, petiolate, with veins running straight from the midrib to the margin. The species require a compost of peat and loam. Cuttings will root freely if inserted in sand, under a glass, in heat. The most interesting species of the genus is *D. domingensis*, the Chaw-stick of Jamaica.

GOURDS (*Cucurbita*). The species and varieties of Gourds are very numerous, and, as they readily cross-hybridise when growing near each other, it is somewhat difficult to keep the sorts distinct without having them isolated. Some have fruits highly coloured and very ornamental, and others produce them of an enormous size. From investigations made by M. Naudin, in France, where Gourds are more largely cultivated than here, the edible varieties have been referred to three species of *Cucurbita*, namely, *C. maxima*, *C. moschata*, and *C. Pepo*. The first-named includes the varieties with unfurrowed stalks and large broad leaves, such as the Large Yellow and Turk's Cap Gourds. Varieties with slightly-furrowed stalks, much enlarged near the fruit, deeply-lobed leaves, and rough seeds, are referred to the second species. *C. Pepo* comprises all the varieties with slender, deeply-furrowed stalks and deeply-lobed leaves with rough hairs; these include the Vegetable Marrow, Custard, Crookneck, and Orange Gourds. With the exception of the Vegetable Marrows, Gourds are cultivated in this country more as curiosities than for the value of their fruits for eating. Where the fruits of the very large sorts can be ripened before frost sets in, they may be cut, suspended in a dry, airy place, and kept for several months. The flesh is usually scooped or cut out, after being kept some time, and used in soups and stews, or baked, either alone or with apples, in pies. The fruits may also be cooked as a vegetable when young. All the plants are annuals, and hardy enough to succeed outside, in warm positions, from May until autumn. Many of them are vigorous-growing trailing subjects, that may be utilised—particularly the ornamental ones—for covering bare walls, hedges, unsightly fences, &c. Seeds should be sown in a gentle heat, in April, and the young plants afterwards grown on and hardened before being placed outside, about the end of May. Protection should then be afforded by handlights, until danger of frost is past, and the plants have become established. All the sorts

Gourds—*continued.*

require a rich soil, which should be placed above a large heap of manure; and any quantity of water may be applied to the roots in summer.

Sorts. The following are amongst the best in the sections representing large-fruited kinds and those of an ornamental character. The Apple, Pear, and Lemon Gourds are varieties having fruits more or less resembling those after which they are popularly named. Various ornamental *Cucurbitaceæ* not belonging to the genus *Cucurbita*, will be found under their proper headings. *See also* **Vegetable Marrow.**

Boulogne Grey. Fruit large; rind deep olive-green, towards maturity covered with a fine network of greyish lines; flesh yellow, thick and floury. According to Vilmorin, this was raised only a few years ago, at Boulogne-sur-Seine, but it is now widely grown, and is much esteemed by the market gardeners about Paris.

Chestnut Gourd. Fruit medium or small, depressed; ribs indistinct or altogether absent; rind smooth, deep brick-red; flesh deep yellow, very thick, sugary and floury. An excellent variety, of vigorous habit. SYN. Corfu Gourd.

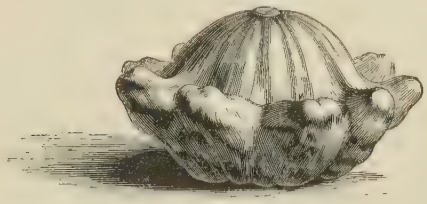


FIG. 127. CROWN OR CUSTARD GOURD.

Crown Gourd, or **Custard Marrow.** Fruit scolloped at the edge, produced close to the stem. Plant compact; does not run on the ground. See Fig. 127.

FIG. 128. LARGE YELLOW GOURD.

Egg-shaped. Fruit large, with a hard skin, of a reddish colour. A free-bearing, vigorous, trailing variety.

Embroidered Warted. Fruit small, with yellow flesh; skin beautiful yellow, covered with large excrescences. An exceedingly ornamental variety, but rather tender.

Green-striped Bergen. Fruit dark green and white striped, small. Of compact vigorous habit. Much cultivated in America.

Hubbard Squash. Fruit pointed, suddenly narrowed into the stalk; rind deep green, sometimes marbled with brick-red; very hard and thick, flesh deep yellow, very floury, not very sugary, and somewhat dry. In the United States, this is regarded as a variety of excellent quality. It is a good keeper. Habit vigorous.

Gourds—*continued.*

Large White. Fruit cream-coloured, very large with a smooth rind, more spherical than the Large Yellow. A very distinct variety. It is the *Potiron blanc gros* of the French.

Large Yellow. Flesh deep yellow. Stems very thick, running to a great length along the ground. The fruit is used in a ripe state, and has been grown to a weight exceeding 200lb. SYN. Mammoth Pumpkin. See Fig. 128. In the United States, a variety with a finer rind, but otherwise much resembling this, is cultivated under the name of Connecticut Field Pumpkin.

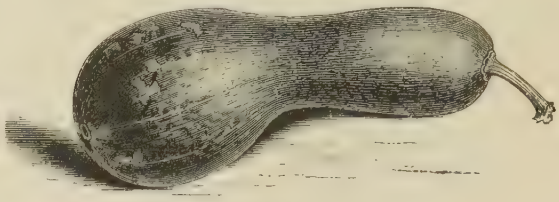


FIG. 129. NAPLES GOURD.

Naples Gourd. Fruit large, sometimes 1½ft. long; rind a deep green, turning yellow when thoroughly ripe, smooth; flesh perfumed, orange-yellow, sugary. A very productive variety. SYN. African Gourd. See Fig. 129.

FIG. 130. NUTMEG GOURD OF MARSEILLES.

Nutmeg Gourd of Marseilles. Fruit nearly spherical in shape, flesh very red and highly musk-scented. See Fig. 130.

Ohio Squash. A fine-flavoured, heavy variety, that keeps well when ripe.

Olive Gourd. Fruit the form and colour of an unripe olive; rind thin, quite smooth; flesh yellow, firm, abundant. A strong grower.

Orange. Fruit resembling an orange in size, form, and colour. Bears abundantly, and is very ornamental.

Patagonian. Fruit large, oblong, sometimes tapering to each end; flesh yellow; skin deep green, frequently ribbed. Keeps well. See Fig. 131.

Red Etampes. Fruit medium-sized, prominently ribbed; rind bright orange-yellow. Habit of plant like the Large Yellow, but foliage paler in colour. This variety is one of the most popular amongst the growers who supply the Paris markets.

Spanish. Fruit green, flat, of medium size, firm, and of good flavour.

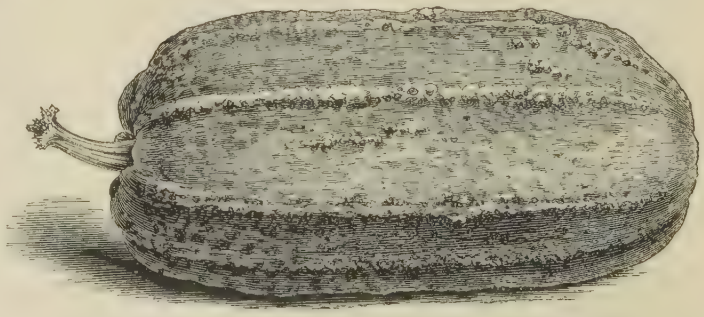


FIG. 131. PATAGONIAN GOURD.

Gourds—*continued.*

Summer Crookneck. Fruit bright yellow, small, with warty excrescences on the surface. Plant compact, does not run.

FIG. 132. TURK'S CAP GOURD.

Turk's Cap. Fruit pale green, flat, with rounded margin; centre elevated, of a deep green, marbled white and yellow; medium-sized, firm flesh. An ornamental variety. SYN. Turban Pumpkin. See Fig. 132.

Valparaiso. Fruit oblong, citron-shaped, sometimes 1½ft. long by 1ft. in diameter in its widest part; flesh orange-yellow, sugary; rind greyish-white, covered with a fine network when ripe. A strong grower, stems attaining a length of 4yds. or 6yds.

Winter Crookneck. Fruit pale yellow, solid, with long neck. A runner variety, and an abundant bearer. Much grown in America.

Yokohama Gourd. Fruit flattened, generally twice as broad as long, irregularly ribbed, very dark, almost black, green. (*Cucurbita melonæformis*, R. H. 1880, 137, 431.)

GOVENIA (named after J. R. Gowen, Esq., the raiser of some fine hybrid Rhododendrons, &c.). ORD. *Orchideæ*. A genus containing about sixteen species of stove terrestrial orchids, natives of tropical America. Flowers usually white or cream-coloured, but in some yellow, with or without blood-red spots; sepals and petals free, of nearly equal length; lip much shorter, without spur, entire, and jointed to the base of the column. About seven species have been cultivated; but, in all probability, those described below are the only ones now to be met with. For culture, *see* **Bletia.**

G. Andrieuxii (Andrieux's). *fl.* yellowish, white at base; lip white, spotted purplish-red in front, above yellow, barred with brown. Mexico, 1884.

G. deliciosa (delicious). *fl.* white, marked with small purple bars inside; lip nearly elliptic, apiculate, with dark brown spots in front. Mexico, 1884.

G. Gardneri (Gardner's).* *fl.* white, spotted, refracted after flowering; raceme elongated; sepals and petals ovate, bluntish; lip ovate, acute, naked, marked with five marginal spots and two convergent convex lines in middle; scape bluntly tetragonal, sheathed in middle. *h.* 2ft. Brazil, 1837. (B. M. 3660.)

G. utriculata (bladdery). *fl.* white; racemes elongated, many-flowered; sepals and petals curved, acuminated; lip oblong, ovate, acute. September. *l.* twin, broad-oblong, plicate, Pseudo-bulbs ovate, inclosed in a large, membranous, oblong-pellucid, striated, sheath. *h.* 1½ft. Jamaica, 1843. (B. M. 4151.)

GRABOWSKIA (named in honour of Mr. H. Grabowsky, an apothecary, and a botanical author, of Ohlaf, in Silesia, 1792-1842). ORD. *Solanaceæ*. A genus containing four or five species of hardy or half-hardy shrubs, natives of extra-tropical South America. Flowers pale violet. Leaves obovate or oblong, entire. The genus is nearly allied to **Lycium** (which *see* for culture).

G. boerhaaviæfolia (Boerhaavia-leaved). *fl.*, corolla pale dull blue, imbricate in æstivation; calyx fleshy, sub-regular, often broadly cleft. April. *l.* fleshy, glaucous. *h.* 6ft. Peru, 1780. A singular spiny scrambling shrub, sufficiently hardy to withstand our winters when planted in the open shrubbery border in the South of England, or against a south wall elsewhere. (B. R. 1985.)

G. duplicata (toothed). *fl.* axillary, fascicled, from the upper leaves; calyx tube short, hemispherical; limb of five spreading ovate-lanceolate segments; corolla greenish-white; tube straight, very hairy within. July. *l.* alternate, very broadly ovate, or almost orbicular, exceedingly glaucous, waved, entire, slightly attenuated at the base into a moderately short petiole. South Brazil, 1840. Half-hardy. (B. M. 3841.)

GRAFT. A small shoot or scion of a plant or tree, inserted on another plant, the stock, which supports and nourishes it.

GRAFTING is an art which has been practised from a period of remote antiquity; by whom it was discovered is unknown. The operation consists in placing two cut surfaces of one or of different plants under conditions which cause them to unite and grow together. The plant — usually termed the stock — on which the graft is inserted, should, in almost every case, be provided with roots, for the purpose of drawing and transmitting nutriment to support the graft after a union has taken place. The part inserted is called the scion, and is analogous to a cutting placed in the soil, although its growth is developed by nourishment supplied through the stock. The action of the one on the other is frequently marked and very important. Some fruit-trees, for instance, grow freely on one stock, but scarcely bear, whilst on others they produce abundant crops, though they do not grow so vigorously; nevertheless, although both are so intimately connected, they retain their individual characters distinct. The stock will become enlarged by the elaboration of sap in the leaves of the scion without the nature of the wood in either case being much altered, each part forming its own peculiar secretion from sap arising from the same source. Scions from variegated trees will frequently cause variegated shoots to develop on the stock far below the graft; and these can be used to increase the supply of a given form just as well as those produced by the original tree. The Golden Laburnum is a well-known case in point.

The importance of the possibility of Grafting cannot be over-estimated, as, by its adoption, the propagation of varieties of fruits, flowers, many forest trees, shrubs, &c., is rendered available, and the good qualities or habits of any are retained, without alteration, excepting such modifications as may be caused by the superior constitution or special suitability of the stock. Grafting may also be employed for restoring defective branches on any part of an otherwise healthy fruit-tree, or for the insertion of fruit-bearing wood, where there is a deficiency. Seedling fruit-trees are brought more quickly into a bearing condition by being grafted on fruit-bearing stocks, so soon as sufficiently-matured scions can be obtained. The two sexes of monœcious plants may, in some cases, be brought together on one stock in order to eventually insure their reproduction by self-fertilisation. Certain conditions are essential for attaining success in Grafting. A great deal depends on the skill of the operator, the condition of the sap, a healthy growth in the stock and scion, and the season when the operation is performed. In order that a vital union may take place, it is essential that the two parts employed should have a natural affinity to each other, either as varieties of the same species, species of the same genus, or genera of the same natural order. In the works of celebrated ancient writers, accounts are given of various attempts having been made, and supposed unions effected, under conditions which have since been found impossible, on account of a natural affinity being non-existent. A temporary union has sometimes taken place, but not a vital and lasting one. A fundamental principle, which applies to every method of Grafting, is the necessity of forming a direct communication between the layers of inner bark in each of the parts to be united; as, without this, a perfect joining is not effected. The pithy or woody parts never unite, as may be frequently observed when grafted trees of long standing are cut down, and the ends of wood originally placed in contact are found to have become decayed. Provided this essential principle be kept in view, the methods of Grafting may be varied almost indefinitely. The natural vigour of the stock and scion should be somewhat similar for inducing a steady growth; but, at times, it is preferable that the scion should be the

Grafting—*continued.*

hardier and more vigorous of the two. This is exemplified, and the desired results attained, in many cases, by Grafting various strong-growing varieties of Apples on the Paradise stock, Cherries on the Mahaleb, and Pears on the Quince. In these and other instances, the stock is restricted in its root-growth, and the supply of sap transmitted to the grafted portion is, consequently, limited. This latter condition tends to encourage fruit-bearing instead of vigorous wood, and proves, by results, the modifying effect of the stock and the superior results in productiveness thereby secured. Double-grafting is sometimes adopted as another means for reaching the same end, by having a variety of intermediate growth inserted first on the stock, this to be ultimately grafted with the

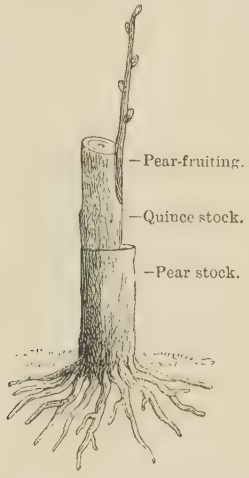


FIG. 133. DOUBLE-GRAFTING.

one it is intended to propagate. Fig. 133 is intended to illustrate what is here meant in the case of Grafting the Pear. The special influence exerted on the part of the stock or scion with certain varieties in either direction, can only be learned by experience. Grafting should be performed when the sap is in motion, between the time when it begins flowing in spring and a period before it ceases in autumn, avoiding the middle of summer, or any very hot weather. It is most largely practised, both indoors and outside, in early spring, the scions being slightly retarded by keeping them in a cooler place, or, in the case of fruit trees, previously cutting and inlaying them in the ground. Calm, moist weather is most suitable for the operation outside, which should always be skilfully performed, by means of clean cuts, a careful fitting of the parts together, and an exclusion of air by the application of grafting-clay or wax. Close frames or cool houses are requisite for tender plants, and for various evergreen trees or shrubs, until the parts have become united. Many of these do not require any clay or grafting wax, if kept moist, quite close, and shaded. Heat is unnecessary in the case of many hardy plants, a protection from the drying influence of wind and sun being all that is required. There are various methods of Grafting that may be successfully practised, according to the size or variety of subject it is intended to propagate or improve. The following are those most generally used, and all are subject to slight modifications under varied circumstances.

In Fig. 134, A shows the mode of tying the graft adopted with many fruit trees, and B the work completed by the application of clay, which should be left in the shape shown, and be carefully fitted to the stock and scion. This plan may be employed either for dwarf

Grafting—*continued.*

or tall stocks. All grafts inserted outside should be protected, and kept from moving by a stake, which

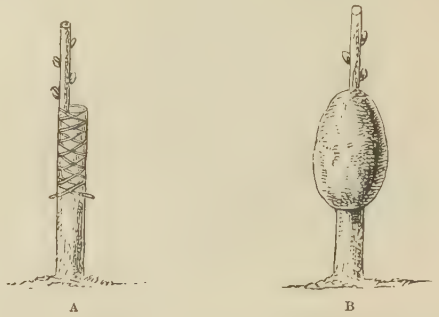


FIG. 134. MODE OF TYING AND CLAYING GRAFT.

should reach nearly or quite to the top, and have both

FIG. 135. MODE OF SUPPORTING THE GRAFT.

stock and scion secured to it, to prevent the latter becoming displaced (see Fig. 135).

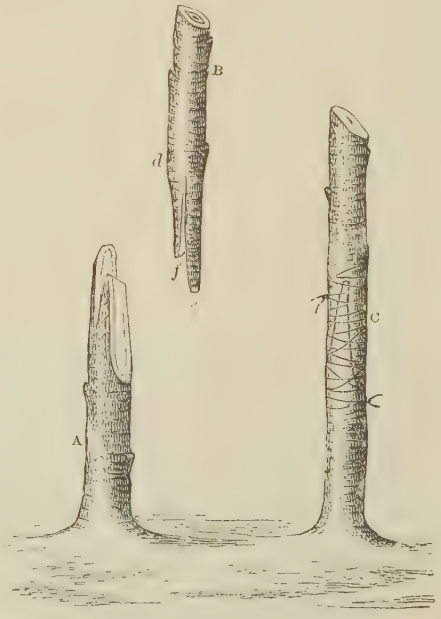


FIG. 136. WHIP OR TONGUE-GRAFTING.

Grafting—*continued.*

Whip, Splice, or Tongue-grafting. This is the best method, and the one generally and most extensively practised in this country. It is represented in Fig. 136, where A shows the stock, B the scion, and C the two fitted together and tied. Whip-grafting is easily performed, and is tolerably certain in its effects, provided the essential conditions be insured, and the work carefully executed. The stock should not be removed until the graft is ready to be inserted, in order that the parts may be quite fresh. It should be cut in a sloping direction, just above a bud if possible, as this sometimes prevents the old wood from dying back. The scion (B) should then be similarly cut through obliquely from *d* to *e*, allowing the latter point to be quite thin. Next, a thin tongue, *f*, must be cut in an upward direction, and the scion will then be ready for insertion. The stock should now be cut in a corresponding manner, so that the tongue fits in its place, and the inner barks come into direct contact with each other when pressed together. Where there is a difference in the sizes of the two parts used, the scion must be placed a little on one side, to insure a union being effected at some part of its surface. The notch should be kept open by the point of a knife until the tongue is properly inserted. When the exposed parts have been fitted as accurately as possible, they should be bound with a ligature of woollen thread, or material of a like description, to hold everything firmly in position, and at once covered with clay or grafting wax, for excluding air and preventing the sun and wind from drying up the sap.

Cleft-grafting. In this mode, which is a very objectionable one in many respects, the stock has to be split open by a chisel or other instrument, and the scion cut wedge-shaped, and fitted in the cleft, so that the inner barks may meet each other. The plan is largely adopted in some parts of the country for woody deciduous trees and plants with old stocks, which are split across, sometimes transversely each way, and two

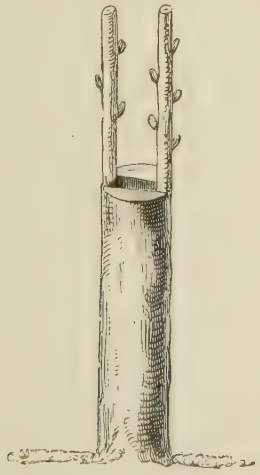


FIG. 137. CLEFT-GRAFTING.

or more grafts inserted, according to the size (see Fig. 137). The objection is, that the wide cleft necessarily made in the solid wood can never unite again in the centre, although, after some time, it may be partially covered by the scions growing over. Another form of Cleft-grafting is shown in Fig. 138, where stock and scion are of the same size. This also has some objections, the stock having to be split and fitted with a wedge *a*, formed on the end of the scion. The cleft invariably extends beyond where it is intended the graft

Grafting—*continued.*

should reach, and, if this happens, the latter, when fitted, prevents that portion of the stock from again becoming united. The stock and scion should be prepared so that all the parts coincide.

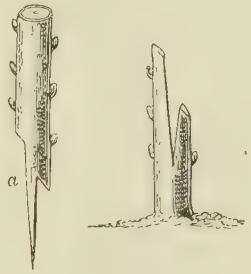
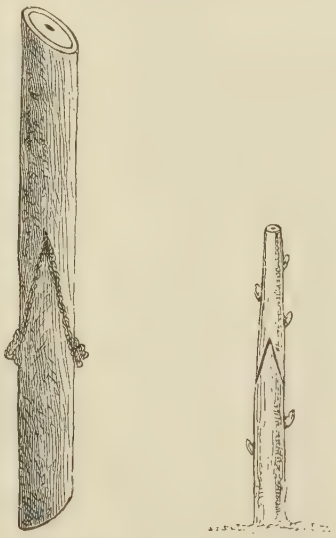


FIG. 138. CLEFT-GRAFTING.

Saddle-grafting. In Saddle-grafting, the stock and scion must, of necessity, be of nearly equal thickness, as the former is cut sloping on each side, like a wedge, and the latter is split up the centre and thinned, to allow of it fitting accurately on the top, as shown in the illustra-



FIGS. 139 AND 140. SADDLE-GRAFTING.

tions (see Figs. 139 and 140). It is important that the scion should not be split further than the end of the stock will reach, and the wood in both should be clean cut with a thin, narrow-bladed knife. For Saddle-grafting, the wood is usually young and vigorous; care must therefore be taken that the ligature is not made too tight at first, and that it is loosened afterwards before injury is caused to the bark. This method has been successfully practised for obtaining dwarf flowering plants of Rhododendrons by Grafting terminal shoots just before the flowering season arrives, and placing them in a close frame, without bandaging or anything beyond a tie. In Wedge-grafting, the positions of parts are reversed, the scion being made wedge-shaped, and fitted into an incision of similar shape and size cut in the stock (see Fig. 141).

Crown or Rind-grafting has advantages over Cleft-grafting, it being practicable to work stocks of considerable age and size without cleaving, and rendering the wood unsound. It is practised in spring, when the bark easily separates; and with this method it has been recommended

Grafting—*continued.*

that the stocks should be cut down a month beforehand, the cuts being again made fresh at Grafting time. The

FIG. 141. WEDGE-GRAFTING.

scion should be about 6in. long, with two or three eyes attached to the upper part. The lower half is cut in a sloping direction, the same as the splice-graft, and the notch or shoulder formed in cutting it is made to fit on the top of the stock. It is then inserted between the bark and wood, which readily separate, if in proper condition. One or more scions may be inserted, according

FIGS. 142 AND 143. CROWN OR RIND-GRAFTING.

to the size of the stem intended for their reception (see Figs. 142 and 143). The cut parts should be afterwards covered with a bandage, not made too tight, and clay or grafting wax. In what is known as Improved Crown-grafting, the top of the stock is cut obliquely, and the bark only raised on one side of the longitudinal cut made for the reception of the scion; the motive being to increase the points of contact between the two portions of bark, and accelerate their cohesion.

Side-grafting is employed for inserting scions without cutting away the head of the stock. It is useful for propagating plants, and also for supplying, where deficient, a branch or stem to any part of a tree (see Fig. 144). There are two systems of Side-grafting: one, by placing a simple, or occasionally a based, branch under the bark, and the other, by inserting branches in clefts cut in the alburnum. A side-graft under the bark may either consist of a branch, having what is termed a shooting-bud, or it may possess one that is dormant. If the former is selected, a branch of the previous year forms the

Grafting—*continued.*

scion, which should be inserted about April, when the sap is flowing. Grafts with dormant buds are made from wood of the current year, and put in about August or September, to develop the following year.

FIG. 144. SIDE-GRAFTING.

The scion may be prepared for the side of an upright stock by making a long splice-cut in the lower part, taking care to render it smooth throughout, and thin at the point. Incisions, not penetrating the alburnum, are then made in the stock, and the scion inserted, in much the same manner as a bud, tied in, and covered with clay or wax. On horizontal branches, the stock may have a notch cut, and a portion of the bark raised nearer the tree (see Fig. 144, *a*), the scion *b* being prepared to fit, as shown at *c*. It will be observed that Double-grafting on established fruit-trees of inferior quality might be largely practised, if desired, by this method. Side-grafting in the alburnum, with an oblique or vertical cleft, is more especially adapted for evergreens, when the operation is performed, under glass, in February, or the latter part of summer.

Ordinary Veneer-grafting is principally employed for propagating various trees and evergreen shrubs, either in spring or autumn, the former preferred. The scion should be well ripened, either of the previous or current year, according to the time it is inserted, and the stock must be in a state of activity. In an evergreen scion, the leaves from the top are not removed. It must be cut with an even splice-cut, about 1in. long, and fitted on the side of the stock previously prepared by having just the same quantity of bark, as far as the first layers of the alburnum, removed that the size of the cut portion in the scion requires. Both parts are then fitted without a cleft or incision being made in the wood; and, after being tied closely with a woollen or cotton bandage, are placed in close frames, with or without grafting wax. The stock should not be headed at first; when the parts have properly united, it may be gradually removed. This method answers well for Rhododendrons.

Grafting by Approach, or *Inarching*, is the oldest system known; examples being frequently seen in trees growing naturally together. It was formerly practised with trees, to form arches, doorways, &c., for picturesque effect, but is now more generally in use for propagating plants that do not succeed well under other methods. The season for Grafting by Approach begins with the flow of sap in the spring, and ends with it in autumn. The operation is performed when the leaves are on the plants forming the stock and scion, and they are allowed to remain on both for some time. The scion intended for Inarching must either be a movable

Grafting—*continued.*

pot plant (as shown in Fig. 145) that may be taken to any place desired, or one planted in close proximity to the stock. A similar portion of wood should be removed from both the parts intended for joining, and they must be carefully fitted together and secured with

FIG. 145. GRAFTING BY APPROACH.

tying material and a bandage. Sometimes, a tongue is cut in the plant forming the scion, and made to fit into a corresponding notch in the stock at the point where the barks meet. In other methods of Inarching, the stock is cut off and the scion inserted on or near its point; and for restoring defective parts, the terminal point of the scion is cut with a thin edge, as for a splice-graft, and inserted where required. Grafting by Approach is much practised with Vines for obtaining fruiting wood of any particular kind in a shorter time than would be possible by ordinary propagation. Some varieties also succeed better when grafted on a stock which is more vigorous than their own. After the cut portions heal and become established, the work of detaching them from their own roots, and removing the branches from the upper extremity of the stock, must be very gradually performed, to avoid extreme checks.

Herbaceous Grafting, as its name indicates, is applicable for increasing plants when still growing, but, at the same time, becoming solidified and passing into an herbaceous state. The system has been applied with success in Grafting the Melon on the Cucumber, the Tomato on the Potato, dwarf species of cacti on tall ones, &c. Its chief advantage, however, is in the increase of resinous trees, principally Pines, by inserting grafts on the points of commoner species, which may be used as stocks. The proper time for the operation is in May, when the young shoots are just beginning to grow, or else when growth stops and the shoots begin changing to a woody nature. Stock and scion should be, if possible, similar in texture. The former must be cut off just below the terminal buds, and nearly all the leaves removed from the point thus obtained. This should be carefully split, and the scion prepared wedge-shaped, and inserted rather deeply, allowing the barks to coincide, as in all other methods. Tie in with worsted, cover the cuts

Grafting—*continued.*

with grafting wax, and shade them from sunshine by paper caps until growth is resumed. The Walnut may be successfully propagated by terminal Herbaceous Grafting, employing shoots for both scion and stock that have not become woody. These trees may also be terminal-grafted in spring, just before growth commences.

Root-grafting is practicable with many plants, either on their own roots or on those of others, and a larger stock is obtainable of such as succeed than by any other method. Good roots should be secured as stocks when the plants bearing them are in a dormant state, and the grafts inserted, in most cases, when the sap begins to flow in spring. Large fleshy roots, such as Dahlias and Tree Pæonies, should have a notch cut in a triangular form, about 1½in. long, and the shoot or graft similarly

FIG. 146. ROOT-GRAFTING (DAHLIA).

prepared and made to fit therein (see Fig. 146). Other plants largely propagated by Root-grafting are Bignonias, Clematis, Hollyhocks, and Wistarias. Saddle-grafting on roots is sometimes employed.

GRAFTING CLAY. This consists of two parts clay and one of cow-dung. Some persons make an addition of finely-cut hay, as being of use in preventing the Clay from cracking and falling off. These ingredients should be beaten together, and thoroughly mixed, several weeks before being required for use, and be then occasionally turned and mixed again. If a cavity is made in the top of the heap, and filled with water, the whole bulk may be kept moist for a long time. Grafting Clay is an economical composition, most useful for excluding air and moisture until a union in the stock and scion is effected.

GRAFTING WAX. In grafting small or delicate plants, the use of clay is scarcely practicable, and various compositions of different substances have been prepared for answering the same purpose. It is essential that whatever is used should not be injurious to the cuts which have to be covered, either by drying or burning them up. Neither must it crack or run off under the action of natural heat and moisture. What is known as warm mastic is applied in a lukewarm state, by means of a small brush or broad wooden label. A good Grafting Wax for using lukewarm may be made of three parts each of resin and beeswax, and two parts of tallow; or these ingredients may be prepared in equal

Grafting Wax—*continued.*

proportions by melting all together in an iron pot over the fire, and afterwards allowing the composition to cool. Burgundy pitch and various other substances are sometimes used in compositions. An excellent preparation that may be purchased in tin boxes, and applied cold, is the French cold Grafting Wax, sold under the name of Mastic l'homme Lefort. This may be spread on the graft with a flat piece of wood, and it hardens by exposure to the air. Cold mastics are not so well suited for autumn grafting outside as warm ones, the frost sometimes having an injurious effect on the grafts through a soft substance. Grafting Wax may be applied to large as well as small plants, if desired.

GRAINS OF PARADISE. *See* **Amomum Granum Paradisi** and **A. Melegueta.**

GRAM, or **CHICK PEA** (*Cicer arietinum*). An annual herb, extensively cultivated in India for its seed, which, when ground, forms an important article of food.

GRAMINEÆ. A large order of annuals or perennials, usually herbaceous, cæspitose, rarely suffrutescent or arborescent. Flowers rarely diclinous monœcious, or diœcious, sometimes polygamous; spikelets in terminal spikes, racemes or panicles, usually composed of two flowers (empty), glumes inclosing or subtending one or more, sessile or stalked, normally flower-bearing (but sometimes also empty) glumes, which are distichously arranged on a slender rachis (*rachilla*); flowering glumes boat-shaped, inclosing the flower and a flat, often two-nerved, scale (*palea*); perianth of two (rarely none, or three or more) minute scales; stamens three (rarely one, two, six, or more), with capillary filaments and two-celled pendulous anthers. Leaves alternate, distichous, springing from the nodes; petiole dilated, convolute, sheathing the stem; margins free, or very rarely more or less united; blade entire, usually narrow-linear, sometimes oblong or oval; margins very often scabrid; nerves parallel; stipule axillary, adnate by its dorsal face to the sheath, and produced as a membranous tongue (*ligule*). The order is widely distributed over the world. "Gramineæ contain in their herbage, and especially in their seeds, nutritious principles, which entitle them to the first rank among plants useful to man, and which are of the greatest importance in an economic and political point of view. The Cerealia are: Wheat (*Triticum sativum*), Rye (*Secale cereale*), Barley (*Hordeum vulgare, distichum,* &c.), Oats (*Avena sativa*), all cultivated by the Caucasian race in the Northern and temperate regions. Rice (*Oryza sativa*) and Millet (*Panicum miliaceum*) originated amongst the Asiatic races. The Sugar-cane (*Saccharum officinarum*) is, in all probability, a native of tropical Asia; it has been cultivated from very ancient times in the East Indies. A considerable number of Gramineæ are medicinal, viz., *Triticum repens, glaucum, junceum, Cynodon Dactylon, Andropogon bicornis, Arundo Donax, Calamagrostis,* &c." (Decaisne and Le Maout). This order likewise furnishes numerous ornamental garden plants, some of the most striking of which are *Arundinaria falcata, Metake, Arundo Donax* (the Provence Cane), *Arundo mauritanica, Bambusa arundinacea, Gynerium argenteum, Panicum plicatum, Phalaris arundinacea,* &c.

GRAMMANGIS (from *gramma*, writing; probably in allusion to the markings of the flowers). ORD. *Orchideæ.* A genus comprising two species of stove epiphytal orchids, one of which is from Madagascar, the other from Java (?). Flowers showy, on long pedicels; racemes loose, many-flowered; bracts small; scape simple. Leaves few, long, coriaceous, veined. Pseudo-bulbs oblong or fusiform, fleshy. For culture, *see* **Saccolabium.**

G. Ellisii (Ellis's). *fl.* numerous; sepals yellow, with several transverse brown stripes; petals and lip whitish; spikes very graceful, bent over, produced from the base of the pseudo-bulbs along with the young growths. Summer. *l.* broad, ligulate, blunt, glaucous. Pseudo-bulbs about 6in. long, square. Madagascar. (B. M. 5179, under name of *Grammatophyllum Ellisii.*)

G. Huttoni (Hutton's).* *fl.* shortly pedicellate, 1½in. in diameter; racemes ten-flowered, pendulous; sepals recurved, obovate, acuminate, pale brown externally, internally studded with transverse, small, short, chocolate streaks; petals smaller, but similar in form and direction, dark chocolate inside; lip sub-sessile, lateral lobes obtuse, greenish, striped with chocolate; scape from the base of the pseudo-bulbs, stout. June. *l.* narrow-oblong, obtuse, very coriaceous, nerveless, dark green. Pseudo-bulbs elongate-ovoid, with straight sides, compressed, grooved, green. Java, 1867. (B. M. 5676, under name of *Cymbidium Huttoni.*)

GRAMMANTHES (from *gramma*, writing, and *anthos*, a flower; in consequence of the petals having some supposed resemblance to the letter V marked on them; hence its synonymous name of *Vauanthes*). SYN. *Vauanthes.* ORD. *Crassulaceæ.* A very pretty half-hardy annual. It thrives in a peaty or light sandy soil, and forms an excellent subject for rockwork. Seeds should be sown in a warm greenhouse, during March, and the seedlings transferred when large enough. Plenty of air, and care in watering, are important features in the culture of this plant.

G. chloræflora (yellow-flowered).* *fl.* at first orange-yellow, finally more red, with a deep V-shaped mark at the base of each corolla lobe; corolla tube equalling the calyx or longer; axillary and terminal lobes ovate or lanceolate, acute. July. *l.* sessile, ovate, acute, succulent, concave. *h.* 4in. to 5in. South Africa, 1774. A glaucous herb. (B. M. 4607.)

G. c. cæsia (greyish). This only differs from the type in its smaller, less brightly coloured flowers, and more glaucous leaves. (B. M. 6401.)

GRAMMATOCARPUS (from *grammata*, letters, and *karpos*, fruit; in reference to the markings of the fruit). SYN. *Scyphanthus.* ORD. *Loaseæ.* A monotypic genus, the species being a half-hardy, twining, pubescent, annual herb, allied to **Loasa** (which *see* for culture).

G. volubilis (twining).* *fl.* yellow, axillary, sessile; calyx tube linear-elongate; lobes five, spreading, linear-spathulate; petals five, saccate. Summer. *l.* opposite, bi- or tripinnatisect. Chili. (B. M. 5028; S. B. F. G. 238.)

GRAMMATOPHYLLUM (from *grammata*, letters, and *phyllon*, a leaf; in reference to the markings on the leaves). ORD. *Orchideæ.* A genus of three or four species of rather large-growing, handsome stove epiphytal orchids, usually very shy of flowering. All are natives of the Malayan Peninsula and Archipelago. Grammatophyllums should be cultivated in large pots, filled with peat. Good drainage and a liberal supply of water, when the plants are in a growing state, are essential elements in their culture. After a few strong growths have been made, the plants should be allowed a season of rest. Propagated by divisions of the pseudo-bulbs. The undermentioned are the only species in general cultivation, and these are still very rare.

G. multiflorum (many-flowered).* *fl.* green, brown, purple; racemes long, many-flowered; bracts oblong, scale-formed; sepals oblong, obtuse; petals similar, acute, narrower; lip three-lobed, downy; middle lobe oblong, rounded; lateral ones erect, subfalcate, with four elevated lamellæ in middle. Summer. *l.* linear, distichous, striated. *h.* 2ft. Manilla, 1838. (B. R. 1839, 65.)

G. m. tigrinum (tiger-spotted). *fl.* yellow, spotted with purple. Summer. *h.* 2ft. East Indies, 1840. (B. R. 1842, 69.)

G. speciosum (showy).* *fl.* nearly 6in. across; sepals and petals undulated, ovate-oblong, rich golden-yellow, spotted with purple; lip three-lobed, streaked with red; scape often nearly 6ft. long, growing from the base of the stem. Winter. *l.* distichous, lorate, acute, 1½ft. to 2ft. long. Stems sometimes 9ft. to 10ft. high. Java, 1837. One of the most elegant plants in cultivation. (B. M. 5157.)

GRAMMITIS. *See* **Gymnogramme** and **Polypodium.**

GRANADILLA. A name given in the West Indies to the fruits of different species of the genus **Passiflora** (which *see*).

GRANULAR. Divided into little knobs or knots; *e.g.*, the roots of *Saxifraga granulata.*

GRAPE. The well-known fruit of the Vine, **Vitis vinifera** (which *see*).

GRAPE HYACINTH. *See* **Muscari.**

GRAPE OR VINE LOUSE (*Phylloxera vastatrix*). This insect belongs to the Aphides, or Green Flies, a group that contains many species very destructive to field and garden crops, but none which approaches this in the injuries done by it. The insect lives on the European Vine (*Vitis vinifera*), forming galls on both roots and leaves; and, when it has once effected a settlement, the plant, if left to itself, soon perishes under the attacks. The injuries to the leaves are of comparatively slight moment; the danger proceeds from the effects produced on the young roots. The insects frequently affix themselves near the tips of newly-formed roots, and push their probosces through the bark, it may be even to the cambium. There results from this a thickening of the bark, due to the development of new cells—hence the formation of galls, some of which reach the size of a pea; and, after a time, the central part of the root also becomes modified. In autumn, the healthy young roots begin to undergo enlargement, to form the older ones of the next year; but, in those affected, the galls die, and the roots also perish. The plants are thus deprived of due nourishment, and are starved; while, at the same time, they are weakened by the abstraction of food by the insects on the older roots and leaves. *Phylloxera vastatrix* passes the winter on

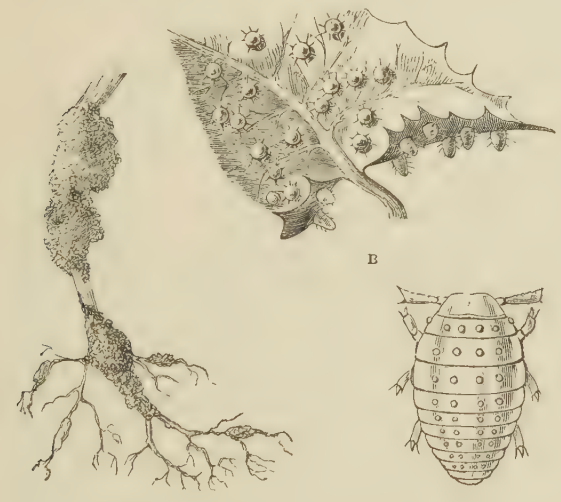


FIG. 147. GRAPE OR VINE LOUSE.

the roots. In spring, the plants push out young branches and leaves, but these soon become yellow, and wither; and the fruits, if they ripen, often remain uncoloured and sour. The next year, the leaves are still more deformed; and fruits are not formed, or do not ripen. The insects leave the Vines before the latter are quite dead, and crawl about in search of new plants. Hence, any diseased plant is a dangerous centre of infection in a vinery. The insects vary in appearance. Eggs laid, in the autumn, between the crevices of the bark on the roots, produce, in spring, larvæ, which pass, with little change, except mere increase in size, into the mature females. These larvæ usually form galls on the leaves, but, at times, the roots alone are attacked. The leaf-galls form small reddish warts on the one surface of the leaf, with small depressions on the other surface. In this depression is the entrance to the gall—a slit, closed with hairs. From the leaf-galls emerge wingless insects, which continue for a time to form new galls, and at last pass down to the roots.

In Fig. 147, A shows sketch of a Vine root attacked by phylloxera; B, portion of leaf of Vine, showing the galls formed on the leaf by the Phylloxera, as seen both on

Grape or Vine Louse—*continued.*

upper and under side; and C, subterranean form of female, magnified. The eggs are about $\frac{1}{100}$in. long. The mature female may reach $\frac{1}{20}$in. in length, and varies in colour from pale yellow to dull brown. The males become winged when mature; the body is about $\frac{1}{50}$in. or $\frac{1}{70}$in. long; the wings are nearly twice as long as the body. The colour is golden-yellow, or approaches dull orange, except a dark band across the thorax. The eyes are red in both sexes.

History. The disease of Vines caused by Phylloxera was first noticed in 1863, in Southern France, but did not seem very dangerous till 1865. Planchon, in 1868, discovered that it was caused by the insect, which, however, had been previously known to zoologists. In 1856, Dr. Asa Fitch observed it in America, and named it *Pemphigus vitifoliæ*. In 1863, it was discovered in vineries near London, and was named by Professor Westwood *Peritymbia vitisana*. In France, it spread very rapidly, even till it reached the most northern vineyards. In the department of Vaucluse, the yield of wine had, in 1876, been reduced to about one-tenth of the former amount. The disease still spreads, and has appeared in most countries of Western and Central Europe.

The effect of the legislation which the dread of the Phylloxera has brought about, seriously interferes with the nurserymen who export plants. In some countries—Germany, for example—no plants are allowed to be imported. An exception in this case, we believe, is made in favour of "bulbs;" but plants equally unlikely to be in any way the means of furthering the spread of the Phylloxera, are rigidly refused admission. In order to send plants to any of the countries in which the regulations of the Phylloxera Convention are enforced, it is necessary to sign a declaration that the package contains no Vines or roots of Vines, that no Vines are grown near the place whence the plants were taken, and that no Phylloxera exists, or has existed, in the immediate neighbourhood. This declaration must be stamped and countersigned by a magistrate, and afterwards be presented to the Consul or Vice-Consul of the country to which it is proposed to send the package, for his *visé*. The fee for the latter varies almost for every country. The declaration is then handed to the agent or railway company who undertake to forward the plants: without it, the goods are not allowed to be sent to their destination.

Remedies. These fall almost entirely under the head of "Prevention of the Spread of Disease," which has been attempted in various countries by strict prohibition of the export of Vines from infected districts, and of the import of Vines into places where disease has not yet appeared (the German law of 11th Feb., 1873, is especially strict in this matter). It has also been attempted by the destruction of the Vines wherever disease has appeared. The German law of 6th March, 1875, enforces the thorough uprooting of infected plants, burning every part, and a disinfection of the soil, for which many substances have been used—the most reliable, however, is carbon disulphide, which destroys the insects on the roots, but does not injure the plants, especially if applied in winter. A mixture of carbon disulphide and coal-tar has also been advised; and a good mode of using it is to scatter on the soil pieces of wood saturated in the mixture, and washed with water-glass (silicate of potash), so as to allow the gases to pass off gradually as the latter dissolves. Another method is, where easily practicable, to lay the soil under water for six or seven weeks. The American Grape Vines, especially *V. cordifolia* and *V. æstivalis*, resist the attacks of Phylloxera far better than do the European species; and, of late years, they have been largely introduced into European vineyards, for the purpose of supplying stocks on which to graft the better flavoured, but more delicate, Old World varieties. ("Enquète de l'Académie des Sciences sur le Phylloxera." Paris, 1879. 2 vols., with many plates.)

GRAPE PEAR. *See* **Amelanchier canadensis.**

GRAPE PHYLLOXERA. *See* **Grape or Vine Louse.**

GRAPE, SEASIDE. *See* **Coccoloba.**

GRAPHOLITHA PISANA. *See* **Pea Moth.**

GRAPPLE PLANT. *See* **Harpagophytum procumbens.**

GRAPTOPHYLLUM (from *grapho*, to write, and *phyllon*, a leaf; referring to the markings on the leaves). SYN. *Earlia*. ORD. *Acanthaceæ*. A genus comprising four or five species of ornamental stove evergreen glabrous shrubs, natives of Australia or the Pacific Islands. Flowers red, shortly pedicellate. Leaves opposite, entire or (in one species) spinose-dentate, generally spotted. The plants thrive in a compost of peat and loam. Cuttings of rather firm young shoots, taken with a heel, will root, if inserted in sand, under a bell glass, in heat.

G. Earlii (Earl's). *fl.* of a rich red, solitary in the axils, or in clusters of very few. *l.* oblong-elliptical, acute or mucronulate, entire, or with a few very small acute teeth. *h.* 10ft. to 15ft. A beautiful glabrous shrub or tree. Australia. SYN. *Earlia excelsa*.

G. hortense (garden).* Caricature Plant. *fl.* crimson, inflated at the throat, whorled, in axillary and terminal racemes. July and August. *l.* elliptical, variegated. 1780. (B. R. 1227, under name of *Justicia picta*.) This species—its native country is unknown—is largely cultivated throughout the tropics for the beauty of its foliage. A variety, with purplish leaves and blood-coloured veins, is figured in B. M. 1870, under name of *Justicia picta lurido-sanguinea*.

G. medio-auratum. A synonym of *Aphelandra medio-aurata*.

GRASSES, ORNAMENTAL. Numerous annual species of Grasses are cultivated, for the double purpose of rendering mixed flower or shrubbery borders attractive in summer, and for the use of the spikes or panicles, in a dried state, intermixed with everlasting flowers, or arranged separately in vases by themselves, in winter. A few perennial species are equally attractive for similar purposes, notably *Arundo conspicua*, *Gynerium argenteum* (Pampas Grass), and *Stipa pennata* (Feather Grass). The annuals may be sown in any soil outside, in March or April; and if the spikes are intended for drying, they should be gathered on fine days before the seeds ripen, and gradually dried in a cool place. A selection of the best and most ornamental would include *Agrostis elegans*, *nebulosa*, and *pulchella*, *Briza maxima* and *minor*, *Bromus brizæformis*, *Eragrostis elegans*, *Hordeum jubatum*, and *Lagurus ovatus*. It is advisable to treat many of the annual species as biennials; that is to say, sow the seeds in July or August. This is too late to allow the plants to flower the same year, but they make finer clumps, and produce larger spikes, the following season.

GRATIOLA (a diminutive from *gratia*, grace; referring to its medicinal virtues). Hedge Hyssop. SYN. *Sophronanthe*. ORD. *Scrophularineæ*. A genus containing about twenty species of pretty free-flowering hardy herbaceous plants, mostly natives of Central Europe, North America, and extra-tropical Australia. Corolla often white or pale, tubular; limb two-lipped, the upper lip notched or cleft into two divisions, the lower three-cleft. Leaves opposite, entire or dentate. Gratiolas thrive in a rich, moist soil. Propagated readily by dividing the roots, in spring.

G. aurea (golden).* *fl.* golden-yellow; peduncles hardly the length of the leaves. May. *l.* broad-linear, sessile, toothed, dotted above. Stem branched at the base. *h.* 4in. North America, 1828. (L. B. C. 1399.)

G. carolinensis (Carolina). A synonym of *G. virginiana*.

G. officinalis (officinal).* *fl.* whitish, striated with purple, pedunculate. May. *l.* lanceolate, serrated. *h.* 1ft. Europe, 1568.

G. pilosa (pilose). *fl.* white; corolla three or four lines long, little exceeding the calyx; tube oblong. July. *l.* ovate or ovate-lanceolate, sparingly and acutely denticulate, closely sessile by a broad base. Stem 1ft. to 2ft. high, from an apparently annual root. North America, 1827.

G. quadridentata (four-toothed). A synonym of *G. ramosa*.

G. ramosa (branched). *fl.* white; sepals linear (two or three lines long), half the length of the corolla. May to August. *l.* lanceo-

Gratiola—*continued.*

late or linear-lanceolate, acute, serrate with sharp coarse teeth, equalling or shorter than the pedicels. *h.* 9in. North America, 1821. SYN. *G. quadridentata*.

G. virginiana (Virginian). *fl.*, corolla four or five lines long; tube yellowish, barely twice the length of the calyx; lobes nearly white, the two upper emarginate. August. *l.* commonly glabrous, oblong-lanceolate, acute, from entire to denticulate-serrate, mostly narrow at the base. *h.* 6in. to 9in. North America, 1759. SYN. *G. carolinensis*.

GRAVESIA (named in honour of C. L. Graves, a writer on the plants of Northern France; he also collected in Madagascar). ORD. *Melastomaceæ*. A genus containing a couple of species of dwarf stove herbs, natives of Madagascar. Flowers disposed in few-flowered umbellate cymes; scape solitary, erect. Leaves petiolate, subradical, ovate-oblong, membranaceous, sub-serrate, five-nerved. For culture, *see* **Bertolonia.**

G. guttata (spotted).* *l.* ovate, 3in. to 6in. long, 2in. to 3in. wide; ground colour rich dark green, profusely dotted with rose-coloured spots arranged in lines. 1864. (B. M. 5524, under name of *Bertolonia guttata*.) The best varieties are:

G. g. margaritacea (pearly).* *l.* ovate-acuminate; upper surface dark olive-green, faintly shaded with purple, with pearly-white spots in regular lines; under side bright pink. 1862. SYN. *Bertolonia margaritacea*.

G. g. superba (superb).* *l.* cordate-ovate, acute, greenish-olive, thickly spotted with rather large circular spots, interspersed among which are very minute dots of the same colour. SYN. *Bertolonia superbissima*.

Other varieties are: *albo-punctata* (white-dotted) and *rosco-punctillata* (rosy-dotted).

GRAY PLUM. The fruit of **Parinarium excelsum** (which *see*).

GREAT BURNET. *See* **Poterium officinale.**

GREEN DRAGON. *See* **Arum Dracontium,** the proper name of which is *Arisæma Dracontium*.

GREEN FLY. *See* **Aphides.**

GREENGAGE. A delicious variety of **Plum** (which *see*).

GREENHEART. *See* **Nectandra Rodiæi.**

GREENHOUSE. A Greenhouse is usually understood to be a structure specially devoted to the cultivation or exhibition of plants that never require a very high temperature. It is distinguished from a conservatory by the occupants being almost exclusively grown in pots and tubs; whereas, in the other instance, many are permanently planted out. Greenhouses have a wide application, ranging from a single house possessed by an amateur, to a large structure set apart for the exhibition of plants that are previously grown to the flowering stage in other houses or pits. Subjects which are available for Greenhouse decoration throughout the year, are almost innumerable, and include a large proportion of the most beautiful plants in cultivation. An important essential for their general well-being is plenty of light; consequently, this is one of the first structural conditions to be secured. Secondly, provision should be made for admitting any quantity of air whenever required, as is the case throughout the summer. The best houses of modern construction are far before those of former years in these respects, the general substitution of large for small panes of glass, and glass roofs for slates, having effected great improvements. In well-arranged Greenhouses, where sufficient plants are at command, a fine display may be insured throughout the year by having a varied selection, and hastening and retarding to keep a succession. Nearly all the improved types of florists' flowers and select annuals are available for pot culture if desired. Exotic plants are extremely numerous and attractive, particularly those from Australia, the Cape of Good Hope, the Himalayas, China, and Japan. Many hardy flowering plants and shrubs may also be lifted from the open ground and forced in early spring—a time when Greenhouses are better furnished and more interesting than at any other season of the year. Where there are other houses and pits devoted to the preparation of flower-

Greenhouse—*continued.*

ing plants, each subject may be much better provided with its special requirements, than when space for cultivation is limited to the Greenhouse only. Here a certain temperature is maintained which suits a number of plants in flower, but may not be warm enough for others that are making their annual growth. If one house can be devoted more especially to the exhibition of those plants in flower and others with ornamental foliage, and they are changed as becomes requisite, the interest in Greenhouse subjects will be rendered more certain. This is, however, frequently impracticable.

Shape and Aspect. Plenty of light and air being essential conditions for keeping in view in the construction of a Greenhouse, it follows that the site chosen should be an open one. The best shape is a span roof, as light is admitted on all sides, and the plants are not so likely to draw or grow in any one direction. Fig. 148 represents a section of a span-roofed house well adapted for Greenhouse

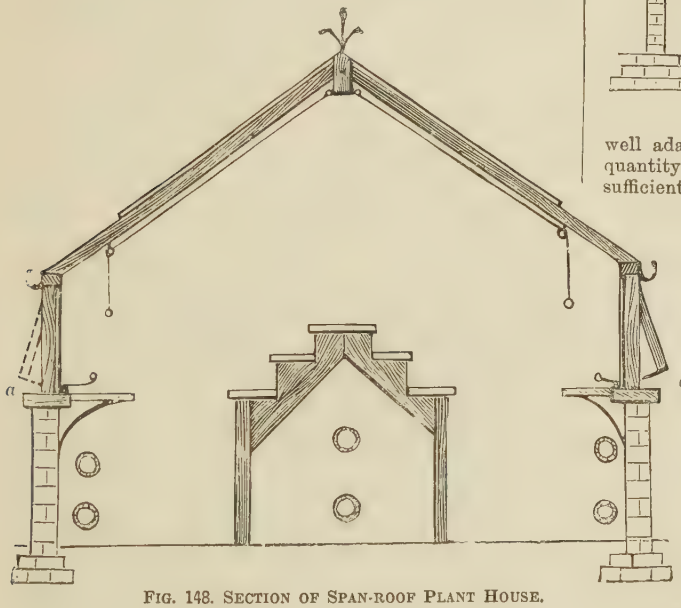


FIG. 148. SECTION OF SPAN-ROOF PLANT HOUSE.

plants. A centre stage is shown that may be made flat if desired, for accommodating vigorous-growing subjects. The side stages are on a level with the walls, and upright sashes above these (*a*, *a*) are hung so as to open in the way indicated. Top ventilation must also be provided, either by sliding sashes, as shown in Fig. 149 (which, however, have the disadvantage of admitting rain if open), or by a more modern method which prevents this, by raising a portion of the roof with a lever. A small lean-to house,

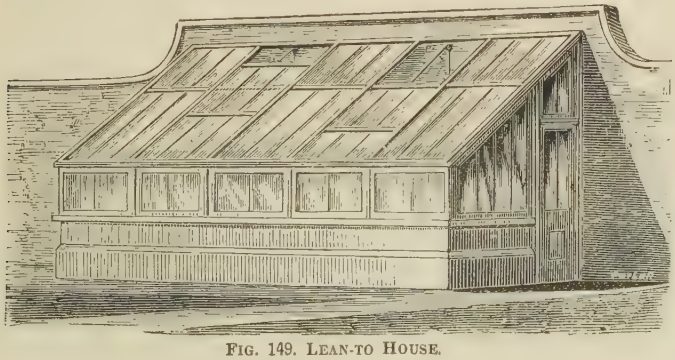


FIG. 149. LEAN-TO HOUSE.

Greenhouse—*continued.*

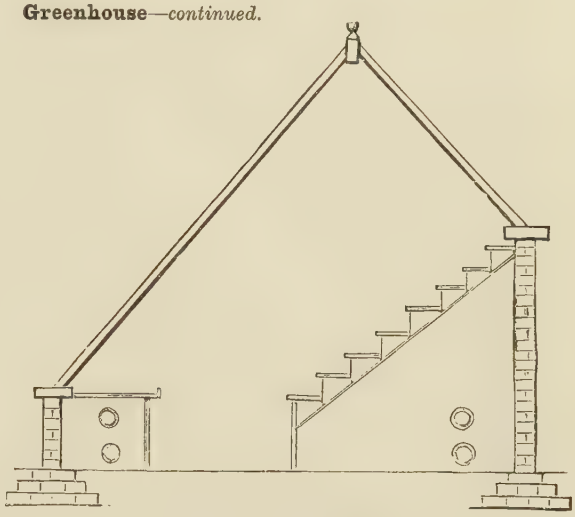


FIG. 150. HIP-ROOFED GREENHOUSE.

well adapted for amateurs or others with only a limited quantity of plants, is shown in Fig. 149. This might be sufficiently heated by a very small hot water apparatus. Hip-roofed houses (see Fig. 150) usually admit light, but are not so convenient for attending and arranging the occupants as the full span. Again, shelf stages are not so favourable to good cultivation as flat ones, where a moist bottom of ashes or small stones may be secured, on which to stand the pots. Ventilation in hip-roofed houses must be obtained by sliding or other movable sashes at the apex, and by small doors inserted in the front wall. The aspect best suited is one nearly south; but, with the full span, the ends should run north and south, so that all possible light may be admitted, and the sun's rays in summer somewhat obstructed in the middle of the day.

Greenhouse plants are divided into two general groups, hard-wooded and soft-wooded.

Hard-wooded Section. This includes all plants of a shrubby habit, and the majority of climbers. A large proportion of them are difficult to cultivate, particularly if their requirements are insufficiently understood, and suitable positions are not provided. The majority flower in spring and summer, and proper treatment varies according to the condition of the plants in such as the growing, resting, and flowering periods. Healthy and floriferous hard-wooded plants in spring, notably the numerous and beautiful species from Australia and the Cape, are only secured by constant attention throughout the preceding summer and winter. Nearly all repotting should be attended to just after the annual growth begins, this season varying with different species. A somewhat closer atmosphere, and more moisture, may be allowed for a month afterwards, to encourage the emission of roots into the new soil. Afterwards, more air may be gradually admitted, and, in bright summer weather, a thin, temporary shading applied. The aim, with hard-wooded plants, should be to encourage summer growth to the fullest extent, and to insure its thorough ripening in autumn. Without this, the results subsequently obtained in the production of flowers will be but secondary compared with what is possible under good cultivation. There are also numerous evergreen shrubs and

Greenhouse—*continued.*

small trees of an ornamental character, well adapted for intermixing in Greenhouses as permanent decorative subjects, and a large proportion may be cultivated in comparatively small pots. When any require larger sizes, they should be shifted in spring or early autumn, and, if possible, kept a little closer for a few days afterwards. Examples of hard-wooded flowering plants are: Acacia, Azalea, Boronia, Camellia, Epacris, Erica, and Pimelia.

Soft-wooded Section. This includes all that have stems and leaves of a more or less sappy growth, and are mostly propagated from cuttings in that state, or from seeds. A large number of florists' flowers are included in this section, and, as many of them are growing throughout the winter months, a position where all possible light is obtainable, should be allotted them. Many soft-wooded subjects are easily cultivated; but they are very sensitive to improper treatment, such as allowing too close an atmosphere, or too much heat or shade. A number of beautiful Greenhouse plants are annually raised from seed, and good strains or selections of such varieties as Calceolarias, Celosias, Cinerarias, Mignonette, Primulas, Rhodanthes, &c., should be secured. These should be sown at different periods, in order to prolong the flowering season. Immunity from insects, and a continued growth without check, are important conditions in the successful cultivation of all. Other plants of a soft-wooded nature, but which become somewhat hard with age, are either propagated each year, or, in some cases, treated as perennials. Examples of these are: Chrysanthemums, Eupatoriums, Fuchsias, Pelargoniums, and Salvias. A selection from each is indispensable for Greenhouse decoration, and all are easily cultivated where space admits. An open and somewhat rich soil is a general requirement, and plenty of air and water in summer, after the plants are become established. Lilies of the Valley, Solomon's Seal, *Deutzia gracilis*, *Dicentra spectabilis*, &c., are amongst the most attractive and useful subjects for forcing.

Greenhouse Bulbous Plants. Amongst these, a great diversity and selection are available for cultivation, and numerous beautiful plants are included. Apart from the value of Dutch bulbs for forcing and spring decoration, nearly all the various species from the Cape succeed under Greenhouse treatment, and are highly ornamental when in flower. The majority may be grown in a sandy soil, and in comparatively small pots. Most Cape bulbs should be encouraged to make their growth in a moderately warm house or pit, and then be allowed a season of rest in a cooler place before flowering. In addition to Hyacinths, Tulips, &c., the following are amongst the best of Greenhouse plants generally termed "bulbous," but some of them are in reality not so: Babianas, Begonias (of the tuberous section), several Crinums, Cyclamens, Freesias, Gladioli, Ixias, Lachenalias, Liliums, Narcissi, Nerines, &c. The foregoing, with many others, are well adapted for pot culture, and well repay for any special attention devoted to them.

Arrangement of Flowering Plants, &c. In Greenhouses retained more for the exhibition of plants than for their cultivation, a method of arrangement should be adopted by which the whole may be rendered attractive, and, at the same time, sufficient space allowed each plant to enable it to be properly seen. In span-roof houses, there are usually side stages, and, if large enough, a central one, or otherwise a bed, nearly level with the floor, forms the centre. The latter position, in either case, should be devoted to the taller-growing plants and evergreen shrubs, interspersed with a few in flower, according to the stock at command. Formal arrangement should specially be avoided, the flowering subjects being evenly dispersed throughout, and, so far as practicable, plenty of plants with green foliage intermixed. Araucarias, Cordylines, Cyperus, Ferns, &c., are especially useful

Greenhouse—*continued.*

for the purpose. Small groups of dwarf plants are frequently more effective than when the same are distributed as single specimens. The side stages should be about 3ft. above the ground, and, if any of the plants are very dwarf, they should be raised on pots or suspended from the roof.

Climbers and Pillar Plants. These are important and attractive additions to Greenhouse embellishment. Many are, however, rather unusually susceptible to the attacks of insects, and, if the latter are allowed a footing, considerable injury is caused to plants underneath. If taken down from the wires each winter, thoroughly washed, and occasionally examined and sponged afterwards during summer, the majority of climbers may be kept tolerably clean; but, if this is neglected, the plants soon become an eyesore, and fail to succeed. Climbers should be planted out so soon as they are large enough to establish themselves, but good specimens should first be prepared in pots. They have, of necessity, to be placed near the side walls, and, as the hot-water pipes are often there, suitable provision is rarely made for roof-covering plants. If such is the case, they can hardly be expected to grow and flower well. An open compost of sandy peat and loam is best, and any special soil may be placed round particular plants requiring it. Copious supplies of water are necessary in summer, but only a little should be applied during the resting period of winter. One or two wires fixed near each rafter, and the plants limited to covering them separately, is the best arrangement, as exclusion of light from plants underneath must be avoided. Fuchsias are amongst the best of subjects, either for pillars or rafters. Tea and Noisette Roses should always be included, and a light position selected for them. *Bougainvillea glabra*, Cestrums, Kennedyas, Passifloras, Swainsonas, and Tacsonias, amongst many others, may be planted where there is space for them to develop.

Airing and Temperatures. A confined, close atmosphere should always be avoided in a Greenhouse devoted to the general cultivation of plants. Cold draughts and improper airing are equally to be condemned. When proper means of ventilation are provided in span-roofed houses, air may be admitted on the opposite side to that from which the wind blows. In pits, or houses of other shapes, the admission of air is an important matter that can only be practised properly after experience is gained. Young and tender growths are frequently much injured through injudicious airing in spring. During warm summer weather, too much can scarcely be given to plants in flower, but with those making their growth its admission should be carefully regulated. A little ventilation at the apex, especially if the house is closely glazed, is advisable whenever the weather is mild. All Greenhouse shrubs permanently employed, and the majority of spring and summer-flowering subjects, should be allowed to rest during winter, by keeping a rather low temperature and a dry atmosphere. A temperature ranging from 45deg. to 50deg. should be a maximum, and 10deg. less will do no injury. In summer, fire heat should be withheld, and the house kept as cool as possible, for preserving the flowers.

Watering. Although a large proportion of cool-house plants require plenty of water, its application indiscriminately would end in destruction with many others. As a rule, those having the finest roots require the least amount of moisture, and as these are invariably hard-wooded, careful watering becomes one of their special requirements. Rules for watering plants are frequently given, but the knowledge can only be properly obtained by experience. Soft-wooded plants require a much larger amount, as their sappy growths are rarely at rest, and the roots should never be allowed to get too dry.

GREENOVIA. Now included under **Sempervivum** (which *see*).

GREEN ROSECHAFER. *See* **Rosechafer.**

GREENWEED. *See* **Genista tinctoria.**

GREGORIA VITALIANA. A synonym of **Androsace Vitaliana** (which *see*).

GREIGIA (named in honour of Major-General Greig, a promoter of Russian horticulture). ORD. *Bromeliaceæ*. A genus comprising two species of large-growing herbs, producing a fine crown of Pineapple-like spiny leaves. Greigias are usually described as requiring stove heat, but in summer they may be placed outside the rock garden or warm border, in light, perfectly-drained soil. In the stove, they require treatment similar to **Billbergia** (which *see*).

FIG. 150. GREIGIA SPHACELATA.

G. sphacelata (scorched). *fl.* rose-coloured, sessile, overlapping each other, and disposed in dense heads; bracts large, tinged with green. Summer. *l.* numerous, erect, sword-shaped, acuminated, fringed with stiff spines. *h.* 3ft. Chili, 1865. See Fig. 150. (R. G. 1865, 474.) SYN. *Billbergia sphacelata*.

GRENVILLEA. Included under **Pelargonium** (which *see*).

GREVILLEA (named in honour of C. F. Greville, a patron of botany). Including *Anadenia, Lysanthe, Manglesia, Molloya, Strangea, Stylurus*. ORD. *Proteaceæ*. A large genus (more than 160 species have been described) of beautiful greenhouse shrubs or trees, limited, with the exception of seven New Caledonian species, to Australia. Flowers in pairs along the rachis of a short and umbel-like or elongated raceme, rarely reduced to a single pair; racemes either terminal or also axillary, rarely all axillary. Grevilleas thrive with ordinary greenhouse treatment. They should be repotted after the flowering season. For general culture and propagation, *see* **Cytisus.**

G. acanthifolia (Acanthus-leaved).* *fl.* reddish, densely disposed in racemes 3in. or 4in. long; styles (as in the other species) long, filiform, considerably exceeding the perianth in length. June. *l.* rigid, divided nearly to the centre; lower divisions coarsely toothed; very suggestive of Acanthus foliage. *h.* 4ft. 1824. (B. M. 2807.)

Grevillea—*continued.*

G. alpestris (rock). A synonym of *G. alpina*.

G. alpina (alpine).* *fl.* red, yellow; racemes very short, terminal, sessile; pedicels pubescent. May. *l.* rather crowded, sessile or nearly so, oval, oblong-lanceolate or almost linear, obtuse or with a small point, sometimes attaining 1in., hirsute or rarely scabrous only above, silky-villous beneath; margins revolute. *h.* 4ft. A much-branched, erect, spreading, or diffuse shrub. SYN. *G. alpestris*. (B. M. 5007.)

G. arenaria (sand-loving). *fl.*, racemes short, terminal, umbel-like, few-flowered, mostly reflexed. *l.* shortly petiolate, obovate-oblong to narrow-oblong, obtuse, with a very small point; margins recurved, minutely hoary-tomentose, and scarcely veined on the upper side, densely tomentose, and often ferruginous underneath. Branches densely tomentose. *h.* 6ft. An erect shrub. SYN. *Lysanthe cana*. (B. M. 3285.)

G. a. canescens (hoary). This closely resembles the type, with the exception that the perianth is more villous, and the points to the laminæ longer. SYN. *G. canescens*. (B. M. 3185.)

G. aspera linearis (rough, linear). A synonym of *G. fasciculata*.

G. asplenifolia (Asplenium-leaved) *fl.* pink; racemes sessile or shortly pedunculate, terminal, or in the upper axils, secund, 1in. to 2in. long. July. *l.* lanceolate or linear-lanceolate, mucronate-acute, entire, acutely toothed or pinnatifid, with short broad acute lobes, contracted into a short petiole. Branches minutely silky-pubescent when very young. *h.* 12ft. to 15ft. 1806. A tall shrub or small slender tree. SYN. *G. longifolia*.

G. Banksii (Banks').* *fl.* red, in dense terminal racemes. August. *l.* 4in. to 8in. long, deeply pinnatifid; segments broadly-linear, decurrent, whitish. *h.* 15ft. 1868. (B. M. 5870.)

G. blechnifolia (Blechnum-leaved). A synonym of *G. Caleyi*.

G. Caleyi (Caley's). *fl.* red; racemes terminal, or in the upper axils, erect, rather dense, secund, shortly pedunculate, 1½in. to 2in. long. June. *l.* deeply pinnatifid or pinnate, with numerous oblong-linear divaricate segments, obtuse or mucronate, with recurved margins, glabrous above, softly villous beneath. Branches densely villous, with soft spreading ferruginous hairs. *h.* 5ft. to 6ft. 1830. A slender shrub. SYN. *G. blechnifolia*. (B. M. 3133.)

G. canescens (hoary). A synonym of *G. arenaria canescens*.

G. Drummondii (Drummond's). *fl.* white, yellow; racemes umbel-like, sessile, terminal, or on very short axillary tufts. June. *l.* sessile, rather crowded, oblong, lanceolate, or linear, obtuse or mucronate; margins recurved. Stems apparently diffuse or procumbent. Branches tomentose and hirsute with long fine-spreading hairs. 1859.

G. dubia (doubtful). A synonym of *G. sericea*.

G. ericifolia (Heath-leaved). *fl.* bright red in the lower part, upper greenish-yellow; racemes terminal, short, but rather loose, and often shortly pedunculate, quite glabrous. Winter. *l.* sessile, linear or lanceolate, mucronate-acute, with revolute margins. Branches pubescent or tomentose-villous. A low, spreading, or diffuse shrub. (B. M. 6361.)

G. fasciculata (fascicled).* *fl.* bright red, with yellow tips; racemes umbel-like, few-flowered, sessile, axillary or terminal. Spring. *l.* sessile or very shortly petiolate, linear-lanceolate, or lower ones oblong-elliptical, obtuse or with a callous point; margins revolute. A low, prostrate shrub in the typical form, but sometimes attaining 3ft. or 4ft. in height. 1873. SYN. *G. aspera linearis*. (B. M. 6105.)

G. glabrata (smooth). *fl.* white; racemes axillary, the upper ones forming a terminal panicle; rachis slender. May. *l.* broadly cuneate, shortly and broadly three-lobed; lobes acute, with fine pungent points, contracted into a petiole, flat, with prominent primary veins. *h.* 5ft. to 6ft. An erect, quite glabrous shrub. 1838. SYNS. *Anadenia Manglesii* and *Manglesia glabrata*.

G. intricata (entangled). *fl.* white; racemes slender, pedunculate, 1in. to 2in. long, and sometimes branched, terminal or lateral. May. *l.* long and slender, once, twice, or three times ternately divided into linear-subulate, almost terete, rigid, acute segments, singly or doubly grooved, often above 1in. long, on a common petiole. Branches slender, glabrous. *h.* 2ft. to 3ft. 1871. (B. M. 5919.)

G. juniperina (Juniper-like). *fl.* pale yellow and green, more or less tinged with red; racemes short, almost umbellate, sessile, terminal. May. *l.* linear, rigid, sharp-pointed. An erect or spreading bushy shrub. (L. B. C. 1003; B. R. 1089.)

G. j. sulphurea (sulphur-coloured). This plant is, according to Bentham, only a variety of *G. juniperina*, from which its differs in the perianth being without any, or scarcely any, red tint. SYN. *G. sulphurea*. (L. B. C. 1723.) This is one of the hardiest of all

Grevillea—*continued.*

the Grevilleas. It flowers freely in the open air, as a wall plant, in the neighbourhood of London.

G. lavandulacea (Lavender-leaved).* *fl.* rich bright rose, racemosely produced in abundance from the points of all the shoots. Spring. *l.* linear, terminated by a sharp spine. 1850. SYN. *G. rosea.* (L. & P. F. G. ii. 56.)

G. longifolia (long-leaved). A synonym of *G. asplenifolia.*

G. macrostylis (long-styled).* *fl.* crimson and yellow, few, in umbel-like axillary or terminal racemes, more or less secund. April. *l.* on short petioles, cuneate at the base, more or less deeply divided into three broad triangular or lanceolate pungent-pointed lobes, nearly glabrous, and more or less veined above, silvery-silky underneath. *h.* 4ft. to 6ft. 1868. (B. M. 5915.)

G. Preissi (Preiss's). A synonym of *G. Thelemanniana.*

G. pulchella (neat). *fl.* white; racemes dense, usually glabrous, terminal or in the upper axils, on short slender peduncles. *l.* pinnate; segments seven to eleven, cuneate, trifid or three-toothed, distinct, or the upper ones confluent and more entire; lobes triangular or lanceolate, acute or pungent-pointed; margins revolute. *h.* 1ft. to 2ft. A rather slender divaricate shrub or under-shrub. SYN. *Anadenia pulchella.* (B. M. 5979.)

G. punicea (scarlet).* *fl.* bright deep red; racemes very short, rather dense, almost sessile at the ends of the branches, very spreading or recurved. *l.* shortly petiolate, oblong-elliptical or almost oval, obtuse, with a small callous point, glabrous, often shining and obscurely penniveined above and frequently with a prominent marginal or inter-marginal nerve, silvery-silky or ferruginous underneath, the midrib alone prominent; margins recurved. An erect shrub. SYN. *Lysanthe speciosa.* (B. M. 6698; B. R. 1319.)

FIG. 151. GREVILLEA ROBUSTA.

G. robusta (robust).* *fl.* orange; racemes panicled. June. *l.* pinnate, with from eleven to twenty-one pinnatifid pinnæ; segments acute, smooth and veiny above, hoary beneath. *h.* 5ft. 1829. A very graceful foliage plant, and for general purposes the best and most easily-grown of the genus. See Fig. 151. (B. M. 3184.)

Grevillea—*continued.*

G. rosea (rose). A synonym of *G. lavandulacea.*

G. rosmarinifolia (Rosemary-leaved).* *fl.* red, disposed in terminal clusters. June. *l.* linear. *h.* 4ft. This very handsome shrub proves to be hardy in the more southern counties of England. 1824. (L. B. C. 1479.)

G. sericea (silky).* *fl.* rose-coloured; racemes very dense, rather short, on short terminal peduncles. *l.* shortly petiolate, oblong-lanceolate or almost linear, mucronate, with recurved margins, glabrous or sparingly silky above and more or less distinctly penniveined, closely silky-tomentose underneath, the midrib alone prominent. Branches rather slender, silky-pubescent. An erect, spreading, or diffuse shrub. SYNS. *G. dubia, Lysanthe sericea.* (A. B. R. 100; B. M. 3798; L. B. C. 880.)

G. sulphurea (sulphur). A synonym of *G. juniperina sulphurea.*

G. Thelemanniana (Thelemann's).* *fl.* bright deep red and yellowish at the tip, produced in dense pendulous racemes, 3in. or 4in. long. Spring. *l.* pinnate; divisions linear, bright green. Branches slender, somewhat drooping. *h.* 3ft. to 5ft. 1838. This is one of the most elegant of the genus. SYN. *G. Preissi.* (B. M. 5837.)

G. vestita (clothed). *fl.* purple; racemes axillary, dense, scarcely exceeding the leaves; rachis pubescent or villous. May. *l.* cuneate, broad or narrow, tapering toward the very narrow base, more or less deeply three or rarely five-lobed at the end; lobes broad, mucronate, and often pungent, glabrous above when old and veined, pubescent or villous underneath; margins recurved. *h.* 6ft. to 9ft. An erect, bushy shrub. SYN. *Manglesia vestita.*

GREWIA (named in honour of Nehemiah Grew, M.D., famous for his work on the Anatomy of Vegetables). SYNS. *Chadara, Mallococca.* ORD. *Tiliaceæ.* A genus comprising about sixty species of trees or shrubs, for the most part confined to the hotter regions of the Old World. Flowers yellow or rarely purple, axillary, few, or more numerous and panicled. Drupe fleshy or fibrous, entire, or two to four-lobed. Leaves entire or serrate, three to seven-nerved. Grewias thrive in a mixture of sandy loam and peat. Propagated by cuttings, inserted in sand, under a glass, in heat. The species here described are those best known to cultivation.

G. asiatica (Asiatic). *fl.*, petals yellow, linear-oblong, half the length of the sepals; peduncles two or more. July and August. *l.* obliquely cordate, base five-nerved. *h.* 12ft. East Indies, 1792. A small tree.

G. occidentalis (Western).* *fl.* purple; peduncles solitary, one-flowered. July to September. *l.* roundish-ovate, blunt-toothed, smooth. *h.* 10ft. Cape of Good Hope, 1690. (B. M. 422.)

G. sapida (savoury). *fl.* yellow, ½in. in diameter; sepals oblong; petals entire, half the length of the sepals. *l.* sub-sessile, ovate or orbicular, doubly serrate, pilose above, pubescent beneath. Tropical Himalaya. A decumbent shrub.

GREYIA (named after Sir George Grey, Governor-General of the Cape Colony, where the species was discovered). ORD. *Sapindaceæ.* A monotypic genus. The species is a handsome greenhouse shrub, requiring full exposure to the sun, and a season of rest (during which it must be kept rather dry) after the wood is ripened. It grows best in a sandy loam. Propagated by seeds; or by cuttings, made of half-ripened shoots.

G. Sutherlandi (Sutherland's). *fl.* showy, five-petaled, crowded in long, thick, terminal racemes. March. *l.* alternate, sub-cordate, stalked, inciso-lobate. Stems stoutish, soft, smooth. Natal, 1859. (B. M. 6040.)

GRIAS (from *grao*, to eat; fruit edible). Anchovy Pear. ORD. *Myrtaceæ.* A genus containing two or three species of tall, hardly branched, stove evergreen trees, natives of tropical America. Flowers white, large; petals four, coriaceous. Leaves very long, oblong, entire. The species are of quick growth, and thrive in a compost of rich sandy loam. Propagated by cuttings of ripe wood, in spring.

G. cauliflora (stem-flowering).* *fl.* produced in short peduncles from the old stem, not particularly ornamental, but very sweet-scented. Berry ovate, about the size and shape of an alligator's egg, of a brownish-russet colour. *l.* alternate, lanceolate, spathulate or entire, drooping, glossy green, sometimes upwards of 3ft. long. *h.* 30ft. to 50ft. West Indies, 1768. (B. M. 5622.)

G. zamorensis (Zamoran). *l.* ovate-lanceolate, 1ft. to 2ft. long. Peru, 1879. A very noble and striking ornamental foliage plant, not yet much grown.

GRIFFINIA (named in honour of William Griffin, a patron of botany). ORD. *Amaryllideæ.* A genus comprising seven or eight species of very ornamental cool

Griffinia—*continued.*

stove bulbous plants, all natives of Brazil. Upper segments of the perianth distinctly broader than the others, and directed upwards; two of the remaining three spread out at right angles, and the third directed downwards. Leaves broad, usually stalked, and peculiarly netted.

FIG. 152. GRIFFINIA BLUMENAVIA.

Griffinias thrive in well-drained fibrous loam. After growth is completed, water should be withheld for a time, in order to thoroughly ripen the bulbs. All the species, unless forced, flower in spring and summer.

FIG. 153. GRIFFINIA HYACINTHINA.

Griffinia—*continued.*

G. Blumenavia (Blumenave's). *fl.* white, streaked with pale rose; umbel six to eight-flowered; scape erect, 6in. to 8in. high. *l.* oblong-lanceolate, 4in. to 5in. in length, on slender petioles. Bulb medium-sized. 1866. See Fig. 152. (B. M. 5665.)

G. dryades (mountain-wood).* *fl.* purplish-lilac, whitish towards the centre, about 4in. in diameter; umbel large, loose, ten to thirteen-flowered; scape stout, 1½ft. high. *l.* large, oblong-lanceolate, 1ft. long. Bulb large. 1868. (B. M. 5786.)

G. hyacinthina (hyacinthine-blue).* *fl.*, upper segments blue at the top, white towards the base, about 3in. across; umbel nine to ten-flowered; scape rather longer than the leaves. *l.* stalked, ovate-oblong, 6in. to 8in. long, with a remarkable lattice-like venation. Bulbs ovate, moderate sized. 1815. See Fig. 153. (G. C. 1874, ii. 14.)

G. h. maxima (largest). *fl.* white, tipped with rich blue, nearly 5in. across; umbel close, ten to twelve-flowered. *l.* broadly ovate-oblong.

G. ornata (adorned).* *fl.* delicate bluish-lilac, fading off to nearly white, long-stalked; umbel twenty to twenty-four-flowered, and forming a spreading head of some 8in. or 9in. across; scape 1ft. to 1½ft. high, compressed, with an acute ridge on each side. *l.* elliptic-oblong; margins much recurved. 1876. (B. M. 6367.)

GRINDELIA (named in honour of David H. Grindel, a German botanist, 1766-1836). SYN. *Donia.* ORD. *Compositæ.* A genus containing about twenty species of hardy or nearly hardy, biennial or perennial, shrubby or herbaceous plants, natives of North America and extra-tropical South America. Flower-heads yellow, solitary at the ends of the branches, and from 1in. to 2in. across. Leaves alternate, sessile or semi-amplexicaul, often rigid, dentate, or ciliato-serrate. Grindelias are of easy culture in peat and loam. Propagated by seeds, sown in spring or autumn, in a cool greenhouse or frame; by cuttings; and by divisions.

G. arguta (sharp). *fl.-heads* yellow. July and September. *l.*, lower ones spathulate; upper ones linear-oblong, serrated, one-nerved. Stem simple. *h.* 1ft. Mexico, 1822. Herbaceous, hardy. (B. R. 781, under name of *G. angustifolia.*)

G. glutinosa (glutinous).* *fl.-heads* yellow; involucres viscid. January to December. *l.* ovate-oblong, serrated, evergreen. *h.* 2ft. Peru, 1803. Shrubby, nearly hardy. (B. R. 187.)

G. grandiflora (large-flowered).* *fl.-heads* deep yellow or orange, which, prior to expansion, is covered with the glutinous balsamic secretion occurring in some other species of this genus, large, about 1½in. across. Summer. *l.*, radical ones spathulate; cauline ones sessile, clasping, dentate. Stem branching near the top. *h.* 2½ft. to 3ft. Texas, 1851. Hardy biennial. (B. M. 4628.)

G. inuloides (Inula-like).* *fl.-heads* yellow. June to September. *l.* sessile, oblong-lanceolate, acute, serrated at end, not viscid. *h.* 1½ft. Mexico, 1815. Shrubby. (B. M. 3737; B. R. 248.)

G. speciosa (showy). *fl.-heads* yellow, nearly 3in. across, covered, to a considerable thickness, with a transparent glutinous varnish. *h.* 2ft. Patagonia, 1852. Shrubby, nearly hardy. (L. & P. F. G. iii. 290.)

G. squarrosa (squarrose). *fl.-heads* yellow; scales of involucre filiform at end, revolute, squarrose. July to September. *l.* oblong, amplexicaul, serrated. *h.* 2ft. North America, 1811. Herbaceous, hardy perennial. (B. M. 1706, under name of *Donia squarrosa.*)

GRISELINIA (named in honour of Franc. Griselini, an Italian botanist, who flourished in the middle of the eighteenth century). ORD. *Cornaceæ.* A genus comprising eight species of trees or shrubs, natives of New Zealand, Chili, and Brazil. Flowers dœcious, in terminal panicles. Leaves alternate, often unequilateral, oblong, sub-quadrate or lanceolate, thick, coriaceous, entire, spinose-dentate or angulate; ribs inconspicuous; veins reticulated. Griselinias thrive in light rich loam, and are propagated by cuttings, or by layers. The species described below are probably the only ones yet in cultivation.

G. littoralis (shore-loving).* *fl.* as in *G. lucida.* *l.* ovate or oblong, less oblique at the base, wedge-shaped or narrowed into the slender rather long petiole; veins very obscure below. *h.* 30ft. New Zealand, 1872.

G. lucida (shining). *fl.* minute; pedicels jointed, very short; panicles axillary, often as long as the leaves, much branched, minutely pubescent, with spreading golden (when dry) hairs. *l.* very obliquely ovate, obovate or oblong, quite entire, obtuse or rounded at the tip, very unequal towards the base, one side much narrower than the other; veins very distinct on the under surface. *h.* 10ft. to 12ft. New Zealand. *G. macrophylla* does not appear to be more than a large-leaved form of this.

GRISLEA (named in honour of Gabriel Grisley, author of a work on the Botany of Portugal, who lived in the seventeenth century). ORD. *Lythrarieæ*. A genus now limited to the one species described below, which is a very pretty stove evergreen shrub. It thrives in a compost of fibry and sandy peat and loam. Propagated by cuttings, obtained in spring from firm young shoots, and inserted in sandy soil, under a bell glass, in heat.

G. secunda (side-flowering). *fl.* pale pink; stamens long, purple. *l.* on short petioles, puberulous on both surfaces. Branchlets glabrous. *h.* 4ft. to 6ft. Venezuela and New Grenada, 1820.

G. tomentosa. *See* **Woodfordia tomentosa.**

GROBYA (named after Lord Grey, of Groby, a munificent patron of horticulture; he died in 1836). ORD. *Orchideæ*. A genus containing two species of greenhouse epiphytal Orchids, natives of Brazil. Flowers yellow or greenish, tinged and spotted with purple, in short racemes; petals broader than the sepals, forming a sort of helmet overhanging the lip; lip small, five-lobed at the apex. Leaves Grass-like, ribbed at the apex. Pseudo-bulbs ovate. For culture, *see* **Stanhopea.**

G. Amherstiæ (Lady Amherst's).* *fl.* ochre-spotted, in pendulous racemes. September. *l.* linear, acute, striated. Pseudo-bulbs ovate, green, terete. *h.* 6in. 1829. (B. R. 1740.)

G. galeata (helmeted). *fl.* green, purple; petals oblong, obliquely-rhomboid, rounded at top, disposed into a helmet along with the dorsal sepal; lateral sepals deflexed, connate at base; lip tripartite; lateral segments linear, middle one cuneate-truncate, with a toothed disk, warted from shining tubercles. Summer. *l.* like those of *G. Amherstiæ*. *h.* 6in. 1836.

GRONOVIA (named in honour of Dr. John Frederick Gronovius, a learned botanist at Leyden; he was a friend of Linnæus, and died in 1763). ORD. *Loaseæ*. A scandent stove or greenhouse annual herb, somewhat resembling the common Bryony. It succeeds in a rich sandy loam. Propagated by seeds, sown on a hotbed; the seedlings, when large enough, being potted off singly, and trained upon sticks.

G. scandens (climbing). *fl.* yellow, small; calyx with a five-toothed border, funnel-shaped; petals five, inserted in the calyx tube. June and July. *l.* alternate, petiolate, broad-cordate, five-lobed, stringy. Texas to Venezuela, 1731.

GROSSULARIACEÆ. A tribe of *Saxifrageæ*.

GROUND CHERRY. *See* **Cerasus Chamæcerasus.**

GROUND IVY. *See* **Nepeta Glechoma.**

GROUND LAUREL. *See* **Epigæa repens.**

GROUND OR EARTH NUT. *See* **Arachis.**

GROUNDSEL. *See* **Senecio.**

GROUNDSEL-TREE. A common name of **Baccharis halimifolia** (which *see*).

GRUBBER, or **GRUBBING AXE.** A useful garden implement for uprooting trees, &c., somewhat similar

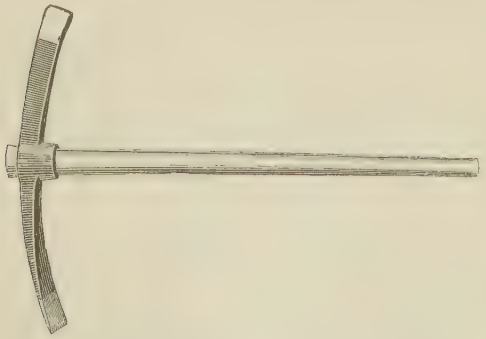


FIG. 154. GRUBBER, OR GRUBBING AXE.

in shape to the ordinary pick, but having both points flattened and made wedge-shaped. One point, for cutting

Grubber, or **Grubbing Axe**—*continued.*

roots or splitting wood, is in a line with the handle; and the other is placed in a transverse direction for clearing roots of soil (see Fig. 154). What is known as a Daisy

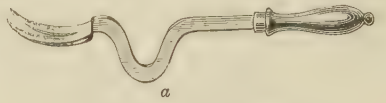


FIG. 155. DAISY GRUBBER.

Grubber (see Fig. 155) is a short implement, made with a claw, for removing the roots of Daisies from lawns. It is furnished with a handle, and the flat portion (*a*) is bent to form a leverage when pressed on the ground.

GRUBS. Apple Grubs may be the larvæ either of a beetle, *Anthonomus pomorum*, or of a small moth, *Carpocapsa pomonana*. The beetle belongs to the group of Weevils, or long-snouted beetles. It is about ⅛in. long, and of a dark colour. In June, the females lay their eggs in the flower buds (one egg in each), and the larvæ soon emerge and live in the interior of the bud, which remains unopened. The grub is footless, of a pale colour, with a dark head. The only remedies are to remove and destroy the buds containing the larvæ and pupæ, and to shake from the branches and destroy the females before they have laid their eggs. *See also* **Apple or Codlin Grub.**

GRYLLOTALPA. *See* **Mole Cricket.**

GRYLLUS. *See* **Crickets.**

GUAIACUM (from *Guaiac*, its South American name). ORD. *Zygophylleæ*. A genus containing about eight species of lofty stove evergreen trees or shrubs, inhabiting the West Indies and sub-tropical North America. Flowers blue or purple; peduncles axillary, one-flowered. Leaves opposite, abruptly pinnate; leaflets entire. Guaiacums require a compost of rich, sandy, fibry loam. Propagated from ripened cuttings, obtained in April, and inserted in sandy soil, under a hand glass, in heat.

G. arborea (tree-like). *fl.* blue, disposed in loose racemes. July. *l.* with seven to fourteen pairs of oval-oblong, blunt leaflets, which are unequal at the base, and are usually alternate. *h.* 40ft. Carthagena, 1816.

G. officinale (officinal).* Lignum Vitæ. *fl.* blue; peduncles twin. July. *l.* with two pairs of obovate or oval blunt leaflets. Bark smooth, variegated with green and white; wood with a peculiar acid aromatic scent. *h.* 30ft. Jamaica, 1694. (B. M. Pl. 41; B. R. 1839, 9.) This species yields the Lignum Vitæ, a greenish-brown, hard, heavy wood, extensively used by turners; and also the fragrant resin commonly called gum guaiacum, which, as well as the bark and wood, is used medicinally.

GUALTHERIA. *See* **Gaultheria.**

GUANO. *See* **Manures.**

GUAREA (from *Guara*, the native name in Cuba). ORD. *Meliaceæ*. A genus comprising thirty species of tall stove evergreen trees or shrubs, natives of tropical America, but rarely seen in cultivation. Flowers white or reddish, in axillary panicles, racemes, or spikes. Leaves pinnate; leaflets opposite or alternate. For culture, *see* **Guaiacum.**

G. grandiflora (large-flowered). *fl.*, petals silky on the outside, hardly ½in. long; racemes elongated. February. *l.*, leaflets many pairs, oval-oblong, 8in. or 9in. long. *h.* 30ft. French Guiana, 1752. All parts of this tree, but especially the bark, have a musk-like perfume.

G. ramiflora (branch-flowered). *fl.* whitish; racemes lateral, very short, rising from the sides of the branches. *l.*, leaflets ovate-lanceolate. *h.* 20ft. Porto Rico, 1822. Tree.

G. Swartzii (Swartz's). *fl.* white; racemes elongated. June and July. *l.*, leaflets lanceolate-ovate, acuminated, feather-nerved, with six or seven prominent lateral nerves beneath. *h.* 20ft. West Indian Islands, 1822. Tree.

GUATTERIA (named in honour of John B. Guatteri, an Italian botanist, once Professor at Parma). ORD. *Anonaceæ*. A genus containing about fifty species of very

Guatteria—*continued.*

ornamental stove evergreen trees or shrubs, all natives of the warmer parts of the New World. Flowers yellowish-white, greenish, or dusky; peduncles one-flowered, axillary or lateral, solitary or fasciculated. Leaves feather-nerved, alternate, entire, exstipulate. Guatterias thrive in a compost of loam, peat, and sand. Propagation is readily effected by cuttings, inserted in sand, under a glass, in heat. Probably *G. Ouregou* is the only species in cultivation.

G. Ouregou (Ouregou). *fl.*, peduncles axillary, short, two to four; calyx segments triangular, pointed; petals rusty-velvety, obovate, interior longer; carpids ovoid. *l.* obovate-oblong, cuspidate, cuneate at the base, shining above, glabrescent beneath; veins prominent. Caribbean Islands. A tall tree. SYN. *Anona chrysopetala.*

GUAVA. *See* **Psidium pyriferum.**

GUAZUMA (name of Mexican origin, employed by Plumier). Bastard Cedar. SYNS. *Bubroma* and *Diuroglossum.* ORD. *Sterculiaceæ.* A genus containing about five species of ornamental stove evergreen trees, natives of the tropical regions of both hemispheres. Flowers small; cymes axillary, shortly pedunculate. Leaves unequally dentate, often oblique. The species thrive in a compost of peat and loam. Cuttings of ripened shoots root freely in sand, under a glass, in heat.

G. ulmifolia (Elm-leaved). *fl.*, petals yellow, with two purple awns at the apex. August. *h.* 40ft. to 60ft. A wide-spreading tree, not unlike the Elm, with leaves that sleep hanging quite down, whilst the petioles remain entirely stiff and straight. West Indies, 1739. SYN. *Bubroma Guazuma.*

GUELDER ROSE. *See* **Viburnum Opulus.**

GUERNSEY LILY. *See* **Nerine sarniensis.**

GUETTARDA (named in honour of John Etienne Guettard, 1715-1786, member of the Academy of Sciences at Paris, who published, in 1747, a catalogue of the plants growing in the vicinity of Estampes). Including *Cadamba* and *Laugeria.* ORD. *Rubiaceæ.* A genus containing about fifty species of ornamental stove evergreen shrubs or small trees, natives chiefly of tropical America. Flowers sessile and unilateral along the branches of the peduncles, and solitary in the forks; corolla salver-shaped, with a cylindrical tube, and from four to nine oval-oblong lobes; peduncles axillary, bifid. Leaves ovate or lanceolate. Guettardas succeed best in peat and loam mixed. Propagated by cuttings, inserted in sand, in heat.

G. odorata (sweet-scented).* *fl.* reddish, nearly 1in. long, villous on the outside, very sweet-scented at night; cymes bifid. Summer. *l.* oval, acute at both ends. *h.* 6ft. to 10ft. Tropical America, 1818. Shrub.

G. rugosa (wrinkled). A synonym of *G. scabra.*

G. scabra (scabrous). *fl.* white; peduncles compressed, villous, almost four times longer than the petioles. *l.* obovate, mucronate, coriaceous, scabrous above, reticulated and pubescent beneath; stipules lanceolate, acuminated, caducous. West Indies, 1818. Tree. SYN. *G. rugosa.*

G. speciosa (showy). *fl.* white, exquisitely fragrant, partaking much of the scent of cloves, large; cymes pedunculate, velvety, much shorter than the leaves. June and July. *l.* broad, ovate or obovate, downy beneath. Branches horizontal, forming a large shady head. *h.* 30ft. Tropical Asia, 1771. Tree. (B. R. 1393.)

GUEVINA (the native name). SYN. *Quadria.* ORD. *Proteaceæ.* A monotypic genus. The species is a greenhouse evergreen tree, succeeding in a peat and loam soil. Propagated by cuttings, inserted in sand, under a glass.

G. Avellana (nut). *fl.* white, hermaphrodite, geminate, pedicellate, disposed in rather long axillary racemes; perianth tube cylindrical; limb ovoid, recurved. June. *fr.* coral-red when ripe, about the size of a cherry. Seed edible, largely used by the Chilians. *l.* alternate, impari-pinnate; leaflets dentate. *h.* 40ft. (in its native country). Chili, 1826. This tree is hardy in the South-west of England.

GUICHENOTIA (named in honour of Antoine Guichenot, a French gardener and traveller). Including *Sarotes.* ORD. *Sterculiaceæ.* A genus containing about half-a-dozen species of greenhouse shrubs, confined to extra-tropical Australia. Flowers nodding, solitary, or

Guichenotia—*continued.*

shortly racemose; calyx five-lobed; petals five, small and scale-like. Leaves narrow, entire, with revolute margins. Guichenotias succeed in a loamy-peat soil. Propagated by cuttings. The two species here described are probably the only ones yet introduced.

G. ledifolia (Ledum-leaved). *fl.* white; racemes several-flowered; calyx scarcely membranous, tomentose, the three prominent ribs on each sepal giving it a rigid, striate appearance. Spring. *l.* on very short petioles, oblong-linear, obtuse, mostly 1in. to 1½in. long; margins much revolute, wrinkled, thick, and soft; stipules similar, but usually rather shorter and more sessile. 1868. SYN. *Lasiopetalum Baueri,* of gardens.

G. macrantha (large-flowered). *fl.* purple, large, pendulous, in racemes of two or three. March. *l.* resembling those of *G. ledifolia.* 1847. (B. M. 4651.)

GUILANDINA. Included under *Cæsalpinia.*

GUILIELMA (named in honour of Queen Frederica Guilielma [Wilhelmine] Carolina of Bavaria). ORD. *Palmæ.* A genus (included, by Bentham and Hooker, under *Bactris*) containing three species of elegant stove palms, confined to the tropical regions of South America. Flower-spike branched. Fruit ovate, about the size of a peach, produced in large pendulous bunches. Leaves pinnate, hairy; leaflets and footstalks spiny. Trunk slender, marked with circular scars, and armed with exceedingly sharp spines. For culture, *see* **Bactris.**

G. speciosa (showy).* *l.* 2ft. to 4ft. long, pinnate; pinnæ about 1ft. long, 1in. wide, apex broader, bifid, deep green nerves on the upper sides clothed with slender black bristles; petioles broadly sheathing at the base, thickly armed with slender long black sharp spines. Stem tall, densely spiny, slender. Amazon. SYN. *Bactris Gasipaés.*

G. utilis (useful). *fl.* monœcious. Seeds edible, having the flavour of chestnuts. *l.*, young ones broad and bifid, bristling with short spines, which spring from the ribs or veins, the ridges of the upper surface and the costa beneath being the parts furnished with them; mature ones forming a handsome pinnate head; petioles densely spiny. Trunk slender, spiny. Costa Rica, 1873. (G. C. 1873, 1271.)

GUINEA PEACH. *See* **Sarcocephalus.**

GUM AMMONIAC. *See* **Dorema Ammoniacum.**

GUM CISTUS. *See* **Cistus ladaniferus.**

GUM ELEMI. The gum-resin of **Amyris Plumieri** (which *see*), &c.

GUMMING. *See* **Gummosis.**

GUMMOSIS, or **GUMMING.** Recent observations on this highly contagious disease have shown that it is caused by a fungus, which has been named by Professor Oudemans *Coryneum Beijerinckii.* The mycelium of this fungus appears to develop a ferment which penetrates the adjacent cells and transforms the cell-walls, the starch granules, and other cell contents into gum, whether these cells belong to the host plant or to the fungus. The ferment of the Coryneum can penetrate into living cells—*e.g.*, those of cambium—and can modify their protoplasm so that the cells that they afterwards produce by division form a tissue with new properties. This tissue is the pathological wood parenchyma. Sooner or later, this tissue begins, in turn, to secrete the ferment, and to change into gum. The quantity of ferment so formed is greater than the amount originally present in the diseased cells. Gumming can be propagated from diseased to healthy places without mycelium extending from one to the other. The action resembles the propagation that albinotic parts exercise on healthy ones. It is conjectured that the channel of propagation is the phloem, and that the contagion is the ferment. In other cases, the mycelium of the Coryneum is the exciting cause of Gumming. A similar disease produces gum arabic, gum tragacanth, and, probably, many resins and gum resins, "One point concerning the spread of this disease seems clear—the fungus itself cannot penetrate the bark: there must be some abrasion or laceration of the latter before the germ tubes can enter. These injuries may clearly

Gummosis, or Gumming—*continued.*

arise from many causes; but how do the spores which are undeveloped in the viscid gum gain access to them? That they cannot be blown there by the wind, is obvious. If the Gumming occurs upon the upper branches, of course they may be washed down by the rain; but how do they spread from tree to tree? Obviously, they must be carried —most probably by insects" (Plowright). The best remedy against this disease would, therefore, appear to be the destruction, by burning, of the infested parts, and carefully coating the cut surfaces with some preservative solution. A *résumé* of Dr. Beijerinck's observations and experiments is given in the "Gardeners' Chronicle," n. s., xxii., pp. 239, 410. Fruit-trees affected by Gumming are: Cherries, Peaches, and Plums. Its effects on Peach-trees are most to be dreaded, neither of the others being so much injured as these. In slight cases, the bark should be frequently well washed in damp weather, with a brush and water; but, where the disease pervades the tree to a considerable extent, it is difficult to effect a cure. Gumming occurs most frequently, and is greatly encouraged, where the soil has been too richly manured, and growth is consequently over-luxuriant. The necessity of removing large branches at pruning time should also be specially avoided by judicious summer stopping of the young shoots, in order to divide the sap, and insure an equal medium growth throughout. Lifting and root-pruning, or planting in a poorer soil, might be adopted to check Gumming, where an undue growth is encouraging it.

GUM SENEGAL. *See* **Acacia Senegal.**

GUM-TREE. *See* **Eucalyptus.**

GUNDELIA (named after Andrew Gundelsheimer, a German botanist, who accompanied Tournefort in his journey into the Levant, in 1709). SYN. *Gundelsheimera.*

FIG. 156. GUNDELIA TOURNEFORTII.

Gundelia—*continued.*

ORD. *Compositæ.* A monotypic genus, the species being a hardy, lactescent, thistle-like perennial. It thrives in a sandy-peat soil, and is propagated by division.

G. Tournefortii (Tournefort's). *fl.-heads* purplish, large, in terminal clusters. June to August. *l.* alternate, sessile, pinnatifid; lobes and teeth very spiny. *h.* 1½ft. Eastern Asia, 1739. See Fig. 156.

GUNNERA (named in honour of J. E. Gunner, 1718-1773, a Swedish bishop and botanist). ORD. *Halorageæ.*

FIG. 157. GUNNERA SCABRA.

A genus containing about eleven species of hardy herbaceous perennials, scattered over the Australian, Malayan, New Zealand, Pacific, and South American Islands; also found in South Africa, and in the Andes as far north as the Gulf of Mexico. Flowers greenish, minute, in dense spikes or branched panicles. Leaves all radical, large, petiolate, ovate or cordate-rotundate, simple or lobed, crenate, coriaceous-carnose, often wrinkled. Some of the species form noble plants for sub-tropical gardening, and grow vigorously in a damp, sunny situation, if sheltered from winds. A slight protection, such as a covering of dry leaves, is advisable in severe weather. Propagated by division.

G. manicata (sheathed).* *l.* 12ft. to 20ft. in circumference, borne upon stout footstalks from 4ft. to 6ft. high. 1867. A majestic plant, from the cold and freezing regions, known in Southern Brazil under the name of Campos des Lages. (I. H. 1824, 128.)

G. perpensa (well-considered). *fl.* green. August. *l.* reniform, toothed, shorter than the scape in fruit. *h.* 1½ft. Cape of Good Hope, 1688. (B. M. 2376.)

G. scabra (rough).* *fl.* reddish, small, very numerous, disposed on a large club-shaped spike. *l.* broad, 4ft. to 5ft. in diameter, borne upon stout prickly petioles 3ft. to 6ft. in length. *h.* 4ft. Chili, 1849. A fine plant for large lawns or parks. See Fig. 157. (F. d. S. 1879.)

GUNNERACEÆ. A synonym of *Halorageæ.*

GUNNIA. Included under **Sarcochilus** (which *see*).

GUSTAVIA (named after Gustavus III., King of Sweden, and a patron of Linnæus). SYN. *Pirigara.* ORD. *Myrtaceæ.* A genus consisting of about eleven species of stove evergreen trees or shrubs, natives of tropical America. Flowers showy; peduncles one-

Gustavia—*continued.*

flowered, sub-umbellate. Leaves large, alternate, ovate or spathulate, glossy. Gustavias thrive in a rich loamy soil. Cuttings, made from ripened shoots, root freely if inserted in sand, under a glass, in heat.

G. gracillima (very slender).* *fl.* rose-red, 4in. in diameter, produced from the leaf axils in the young plants, from the wood in old ones, solitary or in pairs; peduncle stout, clavate, 1in. to 2in. long. September. *l.* close-set, spreading and recurved, acuminate, serrate, narrowed into a slender petiole, 1in. to 2in. long; margin somewhat waved; midrib prominent beneath. Trunk slender, quite glabrous. New Grenada, 1845. (B. M. 6151.)

G. insignis (remarkable).* *fl.*, corolla very large, 5in. to 6in. in diameter; petals cream-white, concave, spreading, externally tinged with rose-colour; filaments rose; anthers orange. June. *l.* glossy, dark green, obovate-lanceolate, acuminated at the point, much attenuated at the base, and sessile, or nearly so. *h.* 3ft. to 4ft. Tropical America, 1858. (B. M. 5069.)

G. pterocarpa (wing-fruited).* This is closely allied to *G. insignis*, but differs from it by the ovary being winged, the smaller and white flowers, the comparatively large calycine lobes, and the more coriaceous, nearly entire foliage. (B. M. 5239.)

GUTIERREZIA (meaning probably commemorative). SYNS. *Brachyris* and *Brachyachiris*. ORD. *Compositæ*. A genus comprising about twenty species of erect herbs or sub-shrubs, peculiar to America, extending from the Red River to Mexico; a few also occur in Chili and the extreme South of the continent. Flower-heads yellow, small, very numerous, arranged in corymbs at the ends of the twigs. Leaves linear, entire, gummy. The species are of botanical interest only. The plant grown in gardens under the name of *G. gymnospermoides* is now referred to the genus **Xanthocephalum** (which *see*).

GUTTA-PERCHA-TREE. *See* **Isonandra.**

GUTTIFERÆ. A natural order of trees or shrubs, with a resinous juice, natives of humid and hot places in tropical regions, chiefly in South America or Asia, while a few are found in Africa. Flowers white, yellow, or pink, often incomplete; sepals and petals two to six, rarely eight. Leaves opposite, leathery, entire. The plants are generally acrid, and yield a yellow gum-resin. There are about twenty-four genera and 230 species. Illustrative genera are: *Calophyllum*, *Clusia*, *Garcinia*, and *Mammea*.

GUZMANIA (named in honour of A. Guzman, a Spanish naturalist). ORD. *Bromeliaceæ*. A genus of four or five species of very handsome stove herbaceous perennials, allied to **Tillandsia** (which *see* for culture). They are all natives of tropical America.

G. Devansayana (Devansay's). *fl.* white, tightly packed within broad, acuminate, scarlet bracts. *l.* dilated at the base, purple-striped. Ecuador. (B. H. 1883, 8, 9.)

G. erythrolepis (red-scaled).* *fl.* white; the uniform purplish-red colour of the bracts distinguishes this at once from *G. tricolor*. *l.* deep green, like those of *G. tricolor*. (F. d. S. 1089.)

G. fragrans (fragrant). A synonym of *Canistrum eburneum*

G. tricolor (three-coloured).* *fl.* pure white; scape erect, 1ft. to 2ft. long, clothed with numerous bracts of a bright pale yellow green, beautifully streaked with blackish-purple towards the top, tipped with red, and at the extreme apex rich scarlet. Summer. *l.* rosulate, broad-linear, sword-shaped, involute, concave, sheathing at the base, 1½ft. long, rich green. 1820. (B. M. 5220.)

GYMNADENIA (from *gymnos*, naked, and *aden*, a gland; the glands of the pollen masses are naked). ORD. *Orchideæ*. Pretty terrestrial orchids, now referred to **Habenaria** (which *see*).

GYMNEMA (from *gymnos*, naked, and *nema*, a filament; the stamineous corona being absent, the filaments are left naked). ORD. *Asclepiadeæ*. A genus comprising about twenty-five species of stove evergreen climbing shrubs or sub-shrubs, natives of Africa, tropical and sub-tropical Asia, and Australia. Flowers yellow, small. Leaves opposite. The plants thrive in a well-drained compost of fibry loam and sandy peat. Cuttings of firm side shoots, made in spring, will root if inserted in sand, in heat.

Gymnema—*continued.*

G. lactiferum (milk-bearing). *fl.* in umbels, shorter than the petioles; throat of small corolla crowned by five fleshy tubercles. July. *l.* on short petioles, ovate, bluntly acuminated, usually unequal-sided. Tropical Asia. The milk of this plant is substituted by the Cingalese for cows' milk.

G. tingens (staining). *fl.* pale yellow, numerous; umbels or corymbs often twin. July. *l.* cordate, acuminated, to oval. Tropical Himalaya, 1823.

GYMNEMA (of Rafinesque). A synonym of **Pluchea** (which *see*).

GYMNOCLADUS (from *gymnos*, naked, and *klados*, a branch; in reference to the naked appearance of the branches during winter). Kentucky Coffee-tree. ORD. *Leguminosæ*. A monotypic genus. The species is a very ornamental hardy deciduous tree. It thrives in a shaded situation, and in a rich, deep, free soil. Propagated by cuttings, made of the roots; or by imported seeds. The name Coffee-tree comes from the fact of its seeds having been used as a substitute for coffee by the early settlers.

G. canadensis (Canadian).* *fl.* white, disposed in terminal simple or thyrsoid racemes. May to July. *l.* bipinnate, with four to seven pairs of pinnæ, the lowest pair bearing single leaflets, the rest bearing six to eight pairs of leaflets. *h.* 30ft. to 60ft. Northern United States, 1748.

GYMNOGRAMME (from *gymnos*, naked, and *gramma*, writing; referring to the spore cases). Including *Ceterach* (in part), *Dictyogramme*, *Grammitis* (in part), *Pterozonium*, *Selliguea*, and *Trismeria*. ORD. *Filices*. A genus consisting of about a hundred species of (except where otherwise stated) beautiful stove Ferns. Sori arising from the veins over the under surface of the frond, linear or linear-oblong, simple or forked. Those species which have the under surface

FIG. 158. FROND OF GYMNOGRAMME CALOMELANOS CHRYSOPHYLLA.

Gymnogramme—*continued.*

of the fronds covered with a yellow powder are popularly known as Gold Ferns, and those with silver powder as Silver Ferns. For culture, &c., *see* **Ferns.**

G. calomelanos (beautiful black). *sti.* tufted, 6in. to 12in. long. *fronds* 1ft. to 3ft. long, 6in. to 12in. broad, tripinnatifid; pinnæ close, lanceolate, lowest largest, about 2in. broad; lower pinnules distinct, often cut down nearly to the rachis; powder white. Tropics, 1790. A variable species. (H. G. F. 30.)

G. c. chrysophylla (golden-leaved).* Very like *G. c. peruviana*, but with darker rachis and bright yellow powder. See Fig. 158. Others included in this species by Mr. Baker are: *Brackenridgei*, *intermedia*, *L'Herminieri*, *Martensii*, and *Massoni*.

G. c. peruviana (Peruvian).* *sti.* and rachis castaneous. *fronds* smaller; lower pinnæ deltoid; lower pinnules often cut quite down to the rachis. See Fig. 159.

FIG. 159. GYMNOGRAMME CALOMELANOS PERUVIANA.

G. caudiformis (tail-like). *rhiz.* woody, creeping, scaly. *sti.* 6in. to 9in. long. *fronds* 6in. to 9in. long, ovate-oblong, acuminate; sterile ones 3in. to 4in. broad; others 1in. to 2in. broad. Malay Archipelago, &c., 1862.

G. chærophylla (Chervil-leaved). *sti.* tufted, slender, 3in. to 6in. long. *fronds* 3in. to 6in. long, 2in. to 4in. broad, quadripinnatifid; lower pinnæ and pinnules deltoid; the segments flabellately cut. Cuba to Paraguay, 1825. An elegant annual, producing an abundance of spores.

G. decomposita (decompound).* *sti.* 1ft. long. *fronds* lanceolate-deltoid, 1½ft. long, 1ft. broad, four or five-pinnatifid; pinnæ close, lanceolate, the lowest largest; pinnules close, stalked, deltoid; powder yellow. South America, 1873. See Fig. 160.

G. ferruginea (rusty). *sti.* tufted, 6in. to 12in. long, tomentose. *fronds* about 1ft. long, 3in. to 4in. broad; pinnæ 2in. to 3in. long, ½in. to 1in. broad, cut to the rachis into oblong or linear-oblong entire or slightly toothed lobes; lower surface and rachis densely tomentose. Tropical America. *G. lanata* is a variety with fronds less woolly beneath, and larger pinnules; the lower ones bluntly lobed half way down.

G. flexuosa (wavy). *sti.* 6in. to 18in. long, flexuose, slender. *fronds* 3ft. to 4ft. long, scandent, three to four-pinnate; pinnæ reflexed, outline sub-deltoid; segments flabellately-branched; rachis zigzag, branched. Central America to Peru, 1865.

G. Hamiltoniana (Hamilton's). *rhiz.* wide-creeping, woody. *fronds* dimorphous; barren ones 1ft. long, 3in. to 4in. broad spathulate; fertile ones 4in. to 6in. long, 1½in. broad; stems more than 1ft. long, slender. *sori* in broad continuous rows. Sub-tropical Himalaya.

G. hispida (hairy). *rhiz.* creeping. *sti.* 3in. to 6in. long, pilose. *fronds* deltoid, tripinnatifid, 2in. to 3in. each way; lower pinnæ much the largest, cut down to the rachis; upper pinnules close, ligulate, blunt; under surface with pale brown tomentum; rachis scaly. New Mexico.

Gymnogramme—*continued.*

FIG. 160. GYMNOGRAMME DECOMPOSITA.

FIG. 161. GYMNOGRAMME JAVANICA.

Gymnogramme—*continued.*

G. japonica (Japanese). *rhiz.* creeping. *sti.* 6in. to 12in. long. *fronds* 1½ft. to 2ft. long, 1ft. broad, pinnate or bipinnate at the base; pinnæ 6in. to 12in. long, 1in. to 2in. broad, linear-oblong, acuminate, entire, lower ones stalked. Japan, &c., 1863. Mr. Baker considers this as "probably not really distinct from *G. javanica.*" There is a variegated form.

G. javanica (Javanese).* *rhiz.* creeping. *sti.* 1ft. to 4ft. long. *fronds* 1ft. to 4ft. long, one to two-pinnate; pinnules sessile or nearly so, 3in. to 12in. long, ¼in. to 3in. broad, the apex acuminate; rachis stramineous; both surfaces glossy. Tropics of Old World. See Fig. 161.

G. lanceolata (lanceolate). *rhiz.* wide-creeping; scales small. *fronds* simple, 6in. to 12in. long, less than 1in. broad, point acute, edge entire, lower third narrowed gradually to the base. Tropics of Old World.

G. Lathamiæ (Mrs. Latham's).* *cau.* erect. *sti.* chestnut-red, tufted. *fronds* 2ft. to 2½ft. long, quadripinnate; pinnæ ascending, triangular, very shortly stalked, upper surface pale green, lower whitish. Supposed to be a hybrid between *G. decomposita* and *G. schizophylla.* It is a plant of garden origin, recently raised by Mr. W. B. Latham, Curator of the Botanic Gardens, Edgbaston.

G. leptophylla (slender-leaved).* *sti.* 1in. to 4in. long. *fronds* 2in. to 4in. long, 1in. to 1½in. broad, ovate or deltoid, two or three-pinnate; segments cuneate-flabellate, cut into linear or oblong lobes. Temperate regions throughout the world (Jersey). Hardy. One of the very few annual ferns.

G. macrophylla (large-leaved). *rhiz.* creeping, scaly. *sti.* 2in. to 6in. long. *fronds* 1ft. to 1½ft. long, 3in. to 4in. broad, narrowed gradually to both ends. *sori* in single continuous or slightly interrupted rows between the main veins. Malaya.

G. Pearcei (Pearce's).* *sti.* 6in. to 9in. long. *fronds* about 1ft. each way, deltoid, quadripinnatifid; lower pinnæ largest, 4in. to 6in. long; pinnules imbricated; one vein and sorus to each ultimate division; powder white. Peru, 1864.

G. pulchella (neat). *sti.* tufted, 6in. to 9in. long, powdery. *fronds* 6in. to 12in. long, 4in. to 6in. broad, tripinnatifid; lower pinnæ largest; pinnules imbricated; segments flabellate-cuneate; powder pure white. Venezuela. The variety *Wettenhalliana* has pale sulphur-coloured powder.

G. rufa (red). *sti.* tufted, 4in. to 12in. long, hairy. *fronds* 12in. to 18in. long, 3in. to 5in. broad, pinnate; pinnæ distant, stalked, rounded, 1in. to 2½in. long; rachis pilose. Tropical America, 1793.

FIG. 162. GYMNOGRAMME SCHIZOPHYLLA.

G. schizophylla (cut-leaved).* *sti.* tufted, slender. *fronds* 1½ft. to 2ft. long, gracefully arching, very finely cut; ultimate pinnules minute. Jamaica, 1880. See Fig. 162.

G. s. gloriosa (glorious). A garden variety, of more vigorous habit than the type. (I. H. 522.)

G. sulphurea (sulphur-coloured).* *sti.* densely tufted, 1in. to 6in. long, often powdery. *fronds* 6in. to 12in. long, 3in. to 4in. broad, tripinnatifid; lower pinnæ gradually reduced; pinnules flabellately cut; powder bright yellow. West Indies, 1808.

G. tartarea (infernal).* *sti.* tufted, 6in. to 12in. long. *fronds* 1ft. to 2ft. long, 6in. to 12in. broad, oblong-deltoid, bipinnatifid; pinnæ lanceolate, lowest largest; pinnules oblong, obtuse, entire or nearly so; powder dense, pure white. Tropical America, 1817.

Gymnogramme—*continued.*

FIG. 163. GYMNOGRAMME TARTAREA.

See Fig. 163. There are three or four varieties, including *ochracea* (pinnules very regular, and only the lowest toothed; powder bright yellow), *ornithopteris*, and *Steltzneri*.

G. tomentosa (tomentose). *sti.* tufted, 6in. to 12in. long, villose. *fronds* 6in. to 12in. long, deltoid, bipinnate; upper pinnæ simple, stalked, 1in. to 2in. long, ½in. to 1in. broad; lower ones 1in. to 4in. long. South Brazil, &c., 1831.

G. triangularis (triangular).* *sti.* densely tufted, 6in. to 12in. long. *fronds* 3in. to 4in. each way, deltoid; lower pinnæ much the largest, deltoid; others lanceolate, deeply pinnatifid; powder varying from deep orange to white. Vancouver's Island, &c., 1874.

G. trifoliata (trifoliate). *sti.* tufted, 8in. to 12in. long. *fronds* 2ft. to 3ft. long, 6in. to 8in. broad, pinnate; lower pinnæ ternate, upper ones simple, petiolate, 2in. to 4in. long; under surface of fertile fronds clothed with white or yellowish powder. Tropical America, 1810. A variable species.

GYMNOGYNOUS. Having a naked ovary.

GYMNOLOMIA (from *gymnos*, naked, and *loma*, a fringe; in reference to the pappus being much reduced or altogether absent). SYNS. *Gymnopsis* and *Heliomeris.* ORD. *Compositæ.* An interesting genus, containing sixteen species of erect greenhouse or half-hardy herbs, natives, for the most part, of Mexico and Central America. Flower-heads pedunculate, solitary or loosely corymbose. Inferior leaves rarely almost all opposite, superior ones rarely almost all alternate, entire, dentate or lobed. The species described below is the one usually seen in cultivation. For culture, *see* **Helianthus.**

G. multiflora (many-flowered). *fl.-heads* yellow. Autumn. *l.* narrowly linear to lanceolate. *h.* 1ft. to 3ft. New Mexico. Annual. SYN. *Heliomeris multiflora.*

GYMNOPSIS. A synonym of **Gymnolomia** (which *see*).

GYMNOPTERIS. *See* **Acrostichum.**

GYMNOSTACHYS (from *gymnos*, naked, and *stachys*, a spike; in reference to the leafless scapes). ORD. *Aroideæ* (*Araceæ*). A monotypic genus. The species is a pretty greenhouse perennial herb. It thrives in a

Gymnostachys—*continued.*

compost of peat and loam. Propagated by suckers and by divisions.

G. anceps (two-edged). *fl.* white, small, sessile, but not closely packed; perianth segments or scales obovate, truncate, not exceeding the ovary; scapes nearly as tall as the leaves, much flattened, with acute, smooth, or serrulate-scabrous edges. June. *l.*, radical ones erect, rather rigid, strongly nerved, 1ft. to 3ft. long. Roots tuberous, fusiform. Australia, 1820.

GYMNOSTACHYUM (from *gymnos*, naked, and *stachys*, a spike; probably on account of the absence of bracteoles). SYN. *Cryptophragmia.* ORD. *Acanthaceæ.* A genus of about fourteen species of ornamental stove evergreen erect herbs, natives of the East Indies and the Malayan Archipelago. Flowers tubular, in erect spike-like racemes. Leaves cauline or sub-radical, entire or obscurely sinuate. The species here described are those usually seen in cultivation. For culture, *see* **Eranthemum.**

G. ceylanicum (Ceylon).* *fl.* small, pretty, in pseudo-verticils; corolla white, tipped with green and yellow. Winter. *l.* opposite, spreading horizontally, oval or obovate, obtuse, obscurely serrated, having milk-white stains upon a dark green ground. Stem very short, downy. Ceylon. (B. M. 4706.)

G. venusta (charming).* *fl.* purple, remotely fasciculated, subsessile, disposed in slender elongated racemes; panicles large, terminal. September. *l.* ovate-acuminate, crenate. *h.* 6in. Bengal. (B. R. 1380, under name of *Justicia venusta.*)

GYMNOTHRIX. Now referred to **Pennisetum** (which *see*).

GYNANDROPSIS (from *gyne*, a female, *andros*, a male, and *opsis*, appearance; stamens appear as if inserted on the top of the ovary). ORD. *Capparideæ.* A genus containing about ten species of half-hardy or greenhouse annual herbs, natives of tropical regions of both hemispheres. Flowers white or purple, often showy; racemes leafy. Leaves three to seven-foliolate. For culture, *see* **Cleome.**

G. coccinea (scarlet). *fl.* scarlet, in a many-flowered corymbose terminal raceme. Summer. *l.* long-stalked, palmipartite. *h.* 6ft. to 9ft. Columbia, 1878. A beautiful cool-house plant.

G. pentaphylla (five-leaved). *fl.* white; petals obovate, four times the length of the calyx; stamens inserted upon the middle of the gynophore. June and July. *l.* quinate; segments obovate-lanceolate or elliptical-lanceolate. Stem unarmed. *h.* 2ft. East and West Indies, 1640. Greenhouse. (B. M. 1681, under name of *Cleome pentaphylla.*)

GYNERIUM (from *gyne*, female, and *erion*, wool; in reference to the stigmas being woolly). Pampas Grass. ORD. *Gramineæ.* A genus of three species of very ornamental hardy, or nearly hardy, herbaceous grasses, natives of tropical and sub-tropical America. They have two-flowered spikelets and dicœcious flowers. *G. argenteum* thrives best in a light sandy soil, well enriched with stable manure. The best positions for it are well-prepared shrubbery borders, or sheltered places in the flower garden or pleasure ground, where it will be protected from high winds. It requires plenty of water when making growth. Propagated by seeds, sown under glass, the young plants being grown on in pots until sufficiently large to plant outside. If it is desired to utilise the plumes for indoor decoration, they should be cut from the plants during the latter part of summer.

G. argenteum (silvery).* *fl.* disposed in a very large, dense, terminal, silky panicle, which, including the stalk, attains a height of from 6ft. to 10ft. Autumn. *l.* linear, glaucous-green, about 6ft. long, in large dense tufts, 4ft. to 6ft. high, and as much across; edges very rough. Temperate South America, 1848. See Fig. 164. Varieties have been raised with purplish or yellowish-tinted panicles.

GYNOPHORE. The stalk of the ovary, within the origin of the calyx.

GYNURA (from *gyne*, female, and *oura*, a tail; in reference to the rough, elongated stigma). ORD. *Compositæ.* A genus comprising about twenty species of stove perennial herbs, inhabiting the tropics of the Eastern hemisphere. Flower-heads corymbose or solitary, at the tops of the branches. Leaves alternate, entire, dentate or pinnate, lobed or dissected. Gynuras

Gynura—*continued.*

thrive in a compost of sandy loam and peat, and are propagated by cuttings. The three species described below are those usually seen in cultivation.

G. aurantiaca (orange-coloured).* *fl.-heads* brilliant orange-colour, about ½in. across; florets all tubular. February. *l.* (and stem) furnished over their entire surface with small hairs of a beautiful violet colour; young leaves surrounding the flower-heads especially hairy. *h.* 2ft. to 3ft. Java, 1880. This may be planted in warm places out of doors during the summer. (I. H. 436.)

G. bicolor (two-coloured). *fl.-heads* solitary, terminal; involucres cylindrical; florets rich orange, slightly spreading, uniform, tubular. *l.* on the under side purple, sub-membranaceous, broad-lanceolate or ovate-lanceolate, slightly downy, penninerved, petiolate; petiole short. Stem herbaceous, erect. *h.* 2ft. to 3ft. Moluccas, 1799. (B. M. 5123.)

G. ovalis (oval-leaved). *fl.-heads* yellow. May to September. *l.* thickish, villous; lower ones oval, repand-toothed, stalked; upper sub-lyrate, amplexicaul. *h.* 3ft. East Indies. (B. R. 101, under name of *Cacalia ovalis.*)

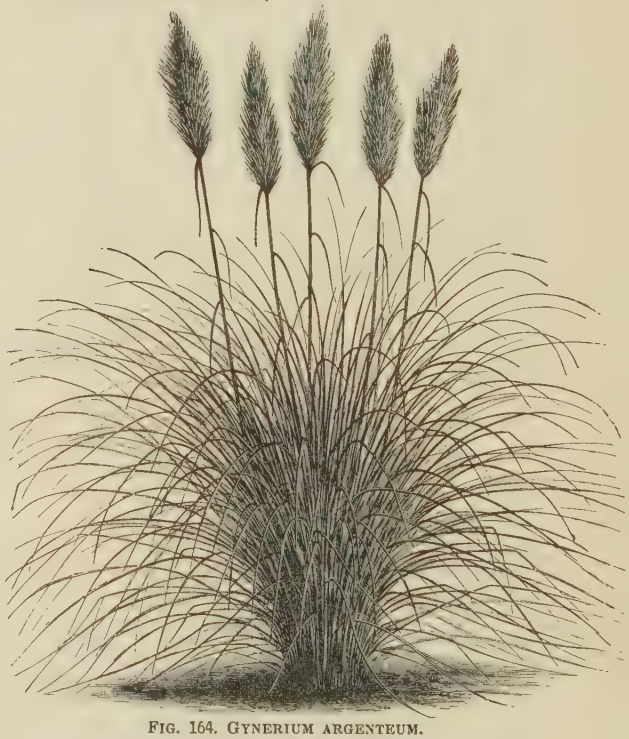


FIG. 164. GYNERIUM ARGENTEUM.

GYPSOPHILA (from *gypsos*, lime, and *philein*, or love; in reference to the species preferring a limestone to a chalky soil). ORD. *Caryophylleæ.* A genus containing about fifty species of hardy annual or perennial herbs, inhabiting various parts of Europe and Asia. Flowers white or pink, small, usually disposed in diffuse panicles. Leaves flat or rarely acerose. Some of the species form excellent subjects for growing as border plants or on rockeries. They thrive in a dryish soil, especially if intermixed with calcareous matter or old lime or brick rubbish. Propagated by seeds, by cuttings, or by division. The species described below are perennials.

G. cerastioides (Cerastium-like).* *fl.* white, red-veined, corymbose; petals emarginate. May. *l.* pilose on both surfaces; margins ciliated; radical ones spathulate, on long footstalks, mucronulate; cauline ones obovate. Stems erect, four-sided. *h.* 3½ft. Himalaya. (B. M. 6699.)

G. fastigiata (fastigiate). *fl.* pale red, corymbosely fastigiate; petals very rarely emarginated. July. *l.* linear, rather fleshy, glabrous, flat. *h.* 1ft. Europe, 1801. (F. d. S. 135.)

G. glauca (glaucous). *fl.* white, panicled; panicle divaricating. July. *l.* linear-lanceolate, somewhat fleshy, obtuse. Branches few-flowered, pubescent, clammy. *h.* 1½ft. Caucasus, 1822.

Gypsophila—*continued.*

G. paniculata (panicled).* *fl.* whitish, small, very numerous, panicled; peduncles smooth, filiform, divaricating. June to August. *l.* few, linear-lanceolate, scabrous, acute. *h.* 2ft. to 3ft. Europe, 1759. A very elegant, light, and graceful perennial. (J. F. A. v. 1.)

G. perfoliata (perfoliate). *fl.* pink, panicled; panicles dichotomous, clammy. July. *l.* lanceolate, half stem-clasping, acute, smooth. *h.* 1½ft. to 3ft. South-western Europe, 1817.

G. prostrata (prostrate). A synonym of *G. repens.*

G. repens (creeping). *fl.* white or pale rose-coloured. July to September. *l.* linear, glabrous. Stems somewhat panicled, few-flowered. *h.* 6in. Alps of Europe, 1774. SYN. *G. prostrata.*

G. Stevenii (Steven's).* *fl.* white, panicled; petals broad-linear, obtuse, entire. July. *l.* linear-lanceolate, keeled, grey. Stem diffuse. *h.* 1ft. to 2ft. Caucasus, 1818.

GYRANDRA. *See* **Erythræa.**

GYROCARPEÆ. A sub-order of *Combretaceæ.*

GYROSE. Bent backwards and forwards, like the anthers of cucurbits.

HABENARIA (from *habena*, a thong or strap; spur long, strap-shaped). SYN. *Sieberia.* ORD. *Orchideæ.* A genus of about 400 species of terrestrial stove, greenhouse, or hardy plants with the habit of *Orchis*, many of which are highly ornamental, and well worthy of a place in any garden. They are found in almost all temperate and warm regions. Among the numerous genera which are now included under *Habenaria* are: *Cœloglossum, Gymnadenia, Phyllostachya,* and *Platanthera.* The species described below are hardy, except where stated otherwise, and form very pretty plants for boggy places, or other situations, in moist, peaty soil. For culture of stove species—of which few are now grown—*see* **Bletia.**

FIG. 165. FLOWER OF HABENARIA BIFOLIA CHLORANTHA.

H. bifolia (two-leaved). Butterfly Orchis. *fl.* white, numerous; lip lanceolate, entire, about half the length of the very long, filiform spur. June. Stem angular, 1ft. high. Britain. According to Bentham, this species varies much in the breadth of the leaves as well as of the parts of the flower, and the extreme forms have been distinguished as species, the name of *H. chlorantha* (see Fig. 165) being given to those in which the flowers are large, and the anther cells much more broadly diverging at the base. Darwin, however, regarded *H. chlorantha* and *H. bifolia* as distinct species, and states that they require different species of moths to fertilise them.

H. blephariglottis (fringed-tongued).* *fl.* white, beautifully fringed, in spikes. May and June. North America, 1820. (L. B. C. 925.)

H. candida (white). *fl.* white; spike few-flowered; sepals ovate-acute, nearly equal, dorsal one horizontal; petals undivided, galeate, obtuse; lip entire, ensiform; spur pendulous, twice as long as ovary, two-lobed at apex. August. *h.* 1ft. Sierra Leone, 1844. Stove.

Habenaria—*continued.*

H. ciliaris (ciliated). *fl.* orange-yellow, arranged in dense clusters; lip beautifully fringed. Stems or spikes very showy, 1½ft. to 2ft. high. North America, 1796. An elegant, but rare, species. (B. M. 1668.)

H. cristata (crested).* *fl.* golden-yellow, crowded, individually much smaller than those of *H. ciliaris*; lip deeply fringed. Late spring. Stem 1ft. high. North America, 1806. (L. B. C. 1661.)

H. dilatata (widened). *fl.* white, densely arranged on slender spikes. Summer. Stem 1ft. to 2ft. high. North America, 1823. Very showy and rare.

H. fimbriata (fimbriated).* *fl.* lilac-purple, large, and prettily fringed, arranged on a long spike. Summer. Stem 1ft. to 1½ft. high. North America, 1789. (B. R. 405.)

H. gigantea (gigantic). *fl.* greenish-white, large, about 4in. across, very fragrant; racemes four to six-flowered. July. Stem about 4ft. high. India, 1834. Stove. (B. M. 3374.)

H. Helleborina (Helleborine).* *fl.* green, flesh-colour, sessile, distant, horizontal; lip much larger than the sepals or petals; limb semicircular; column short, broad, concealed under the dorsal sepals and petals. September. *l.* oblong-lanceolate, subacute, not plaited, five-nerved, deep green. Sierra Leone, 1870. Stove. SYN. *Eulophia Helleborina.* (B. M. 5875.)

H. Hookerii (Hooker's). *fl.* greenish-white. Spikes slender, twenty to thirty-flowered, 6in. to 12in. high. June. North America, 1822.

H. orbiculata (spherical). *fl.* greenish-white, in loose spikes. *l.* very large, silvery-white beneath, prostrate upon the ground. *h.* 1ft. to 2ft. North America. A distinct and very large species. (L. B. C. 1623.)

H. psycodes (fragrant).* *fl.* varying from rose to crimson, very fragrant, fringed; spikes 4in. to 10in. long. June. North America, 1826. A very showy species, allied to *H. fimbriata*, but with smaller flowers.

H. rhodochila (red-lipped).* *fl.*, scape 9in. long; raceme about twelve-flowered; sepals green, united into a hood-like process; lip large, bright cinnabar-red. August. North China, 1884. Greenhouse.

H. rotundifolia (round-leaved.) *fl.* rosy-purple; lip white, spotted with purple; spikes large and compact. Summer. *h.* 1½ft. to 3ft. North America.

H. salaccensis (Salakian). *fl.*, raceme ovate, 5in. to 6in. long; pedicels short, clothed with two or three narrow-lanceolate bracts; sepals spreading, green; petals reddish, very narrow; lip elongated, tripartite; spur reflexed, narrow, tipped with orange; column short. April. *l.*, lower ones 4in. to 5in. long, lanceolate, acuminate, striated; superior ones becoming gradually smaller, bractiform. Stem 12in. to 14in. high, partially clothed at the base with two or three sheathing scales, leafy upwards. Root a tuber, and three or four thick fleshy fibres. Mount Salak, Java. Stove. (B. M. 5196.)

HABERLEA (named after Karl Konstantin Haberle, Professor of Botany at Pesth, died 1831). ORD. *Gesneraceæ.* A monotypic genus. The species is an elegant little hardy herbaceous perennial, not unlike a miniature Gloxinia, and with a tufted habit. For culture, *see* **Ramondia.**

H. rhodopensis (Mount Rhodope).* *fl.* pale lilac, umbellate, drooping; corolla 1in. in diameter; scapes several, stout, two to five-flowered. April. *l.* all radical, spreading and recurved, obovate-oblong, obtuse. *h.* 4in. to 6in. Roumelia, 1880. (B. M. 6651.)

HABIT. The general appearance of a plant; its manner of growth.

HABITAT. Habitation; native country.

HABLITZIA (named in honour of C. von Hablitz, a distinguished Prussian author and traveller). ORD. *Chenopodiaceæ.* A monotypic genus, the species being a tall, hardy, climbing herb. It thrives in any ordinary garden soil. Increased by divisions, or by seeds.

H. tamnoides (Tamnus-like).* *fl.* green, small, in branching cymes, sessile or terminal, pedicellate. July to October. *l.* alternate, on long petioles, triangularly cordate, acuminate, entire, membranaceous, nerved. Caucasus, 1828.

HABRANTHUS (from *habros*, delicate, and *anthos*, a flower). ORD. *Amaryllideæ.* The plants formerly included in this genus are now referred, by Baker and the authors of the "Genera Plantarum," to **Hippeastrum** and **Zephyranthes** (which *see*).

H. Andersonii. *See* **Zephyranthes Andersonii.**

H. bifidus. *See* **Hippeastrum bifidum.**

H. gracilifolius. *See* **Zephyranthes gracilifolia.**

H. miniatus. *See* **Hippeastrum advenum.**

H. versicolor. *See* **Zephyranthes versicolor.**

HABROTHAMNUS. Included under **Cestrum** (which *see*).

HACKBERRY. A name given to **Celtis occidentalis** (which *see*).

HACQUETIA (named after Balthasar Hacquet, 1740-1815, author of "Plantæ Alpinæ Carniolicæ"). SYNS. *Dondia*, *Dondisia*. ORD. *Umbelliferæ*. A monotypic genus. The species is a pretty little alpine herbaceous perennial, thriving in good stiff loam. It is a slow-growing subject, and should not be disturbed. Propagation must, therefore, only be undertaken in the case of strong healthy clumps, which are best divided before growth commences, in spring.

H. Epipactis (Epipactis).* *fl.* yellow, on short pedicels; scapes one to three, bearing at their tops simple umbels; involucre of five or six obovate leaves, which are longer than the umbels. Spring. *l.* radical, petiolate, palmate; leaflets three, cuneated, two or three-cleft. *h.* 3in. to 6in. Europe, 1823. (L. B. C. 1832.)

HADENA OLERACEA. *See* **Pot-herb Moths.**

HÆCKERIA. *See* **Humea.**

HÆMADICTYON. A synonym **of Prestonia** (which *see*).

HÆMANTHUS (from *haima*, blood, and *anthos*, a flower; referring to the colour of the spathe and filaments of some species). Blood Flower. ORD. *Amaryllideæ*. A genus of about thirty species of fine stove or greenhouse bulbous plants, all—with the exception of about five species from tropical Africa—natives of South Africa. Scape, involucre, umbels, and stamens, all add their quota to the interest and beauty of these curious flowers, which, in some of the species, are gathered together into closely compact umbels, and present in the mass a sort of filamentous appearance, somewhat resembling that of the feathered Hyacinth. The culture of *H. sanguineus*, and its allies of similar habit, is of the simplest nature. The various species blossom at different seasons, and it is important that, after flowering, each should have a period of growth, to be followed by one of rest. A mixture of sandy loam and fibrous peat is most suitable, and the plants flower more freely when under-potted. For this reason, it is not necessary to shift them every year. As the bulbs grow, and the strong roots increase, both may be stimulated and supported with weak manure water. Although some of the species of *Hæmanthus* are frequently described as cool greenhouse bulbs, and some even recommend cultivating them in warm borders in the open air, yet they succeed best in a temperature of from 50deg. to 60deg. during the growing season. The sorts with well-developed bulbs should have these quite buried in the soil. When in flower, the blossoms will last longer in cooler quarters. Propagation is effected by offsets, which are produced more or less profusely. They should be removed and potted when the plants are commencing new growth, and be kept in a close pit or house till established. The offsets will reach flowering size all the sooner if kept in a temperature as recommended above for the growing season.

H. abyssinicus (Abyssinian).* *fl.* numerous, in a depressed spherical head, appearing before the leaves; peduncles 1in. to 1½in. long, pale; perianth scarlet, tube ¼in. long; lobes ⅜in. long, slender, with upturned hooded points; filaments scarlet; anthers small, yellow; scape erect, green, 4in. long; spathes 1in. to 1½in. long, pale green and purplish. April. *l.* three to five, autumnal, 4in. to 5in. long, elliptic, green, with purple-spotted sheathing bases. Tropical Africa, 1868. SYN. *H. tenuiflorus coccineus*. (B. M. 5881.)

H. albo-maculatus (white-spotted). *fl.* in a dense head, 2in. to 3in. in diameter; perianth pure white, 1in. to 1¼in. long; ascending linear segments twice as long as the tube; bracts six to seven, white, veined with green; scape 3in. to 4in. long; glabrous. December. *l.* two, contemporary with the flowers, ligulate, fleshy, above 1ft. long, 2½in. to 3in. broad, deep green, copiously spotted white. Bulb compressed, 2in. in diameter. *h.* 6in. South Africa, 1878.

H. cinnabarinus (vermilion).* *fl.* red; umbel twenty to forty-flowered; scape slender, about 1ft. long. April. *l.* long, stalked, four in a radical rosette, oblong, 6in. to 8in. long. West Africa, 1855. (B. M. 5314.)

Hæmanthus—*continued.*

H. deformis (deformed). *fl.* pure white, numerous, shorter than the involucre; head compressed, parallel to the bulb; involucral spathes about six, equal, erect, obovate-oblong, obtuse, ciliate, pure white; perianth tube shorter than the erect, linear, obtuse lobes; stamens exserted; anthers pale yellow; scape very short, sessile amongst the leaves. March. *l.* about two pairs, 3½in. to 4in. long and broad, dark green, smooth, hairy above, pubescent beneath. Bulb 4in. to 5in. in diameter, slightly compressed. *h.* 3in. Natal, 1869. A singular and grotesque species. (B. M. 5903.)

H. hirsutus (hairy). *fl.* pure white, in dense heads, 4in. in diameter; scape compressed, stout, densely hairy. *l.* twin, round-oblong. Transvaal Republic, 1878.

H. incarnatus (flesh-coloured). This species is closely allied to *H. tigrinus*, but is a more elegant plant, with broader leaves; the scape more slender; the divisions of the spathe smaller, narrower, and less coloured; the flowers smaller, and of a different colour. South Africa, 1865. (B. M. 5532.)

H. insignis (remarkable). *fl.* bright orange-scarlet, in an umbel. July. *l.* large, oblong, wavy, and spotted with purple. Stems cylindrical, thickly spotted with purple. Natal. A handsome greenhouse species. (B. M. 4745.)

H. Kalbreyeri (Kalbreyer's).* *fl.* bright crimson; umbel thirty to forty-flowered, 5in. to 6in. in diameter; scape lateral. *l.* oblong. *h.* 6in. Guinea, 1878. (I. H. 354.)

H. Katherinæ (Mrs. Katherine Saunderson's).* *fl.* deep red; umbels dense, 6in. to 7in. in diameter. *l.* oblong, with both veins and veinlets very much more distinct than in the closely allied species *H. multiflorus*. Natal. (B. M. 6778.)

H. Mannii (Mann's). *fl.* crimson-scarlet. Spring. *h.* 1ft. Guinea, 1877. This species closely resembles *H. cinnabarinus* in the flowers, but the leaves are produced from a special stem formed after the scape. (B. M. 6364.)

H. multiflorus (many-flowered). *fl.* deep red; umbels sometimes one-hundred-flowered, dense, globose, about 6in. in diameter. April. *l.* three to four, oblong, acute, nearly 1ft. long, on a short spotted stem. Sierra Leone, 1783. (B. M. 961 and 1995.)

H. natalensis (Natal).* This species is closely allied to *H. insignis*, but may be distinguished from it by the large, beautifully coloured and dotted, sheathing scales at the base of the plant, by the much longer leaves, by the pale green flowers, the orange-coloured stamens and styles, and by the nearly uniform bracts of the involucre, of a rich ferruginous purple, shorter than the flowers. February. Natal, 1862. A handsome greenhouse plant. (B. M. 5378.)

H. puniceus (scarlet).* *fl.* orange-scarlet, with yellow or orange stamens. June. *l.* oblong, elliptical, acute, retuse, wavy. *h.* 1ft. Cape of Good Hope, 1722. (B. M. 1315.)

H. sanguineus (blood-flower). *fl.* scarlet, in dense heads. *l.* two, oblong-elliptic, leathery, glabrous, not spotted. South Africa. This species has decidedly ornamental foliage, and is the one most easily grown. It is a good cool-house plant.

H. tenuiflorus coccineus (scarlet slender-flowered). A synonym of *H. abyssinicus*.

H. tigrinus (tiger-spotted). *fl.* deep crimson, disposed in large heads. April. *l.* linguiform, flat, smooth, fringed at edge, depressed. *h.* 1ft. Cape of Good Hope, 1790. (B. M. 1705.)

H. virescens (greenish). *fl.* whitish. July. *l.* curious, oblong-lanceolate, hairy all over. *h.* 1ft. Cape of Good Hope, 1774. (L. B. C. 702.)

H. v. albiflos (white-flowered). *fl.* white. June. *l.* oblong, strap-shaped, with ciliated margins. *h.* 1ft. Cape of Good Hope, 1791. (B. M. 1239, under name of *H. albiflos*.)

HÆMARIA (from *haima*, blood; in reference to the blood-red colour of the leaves on the under surface). SYN. *Ludisia*. ORD. *Orchideæ*. A genus comprising about four species of terrestrial orchids, natives of China, Cochin China, and the Malayan Archipelago. Flowers racemose, shortly pedicellate or sub-sessile. Leaves shortly petiolate, ovate or elliptic, thickish, membranaceous; bracts membranaceous. *H. discolor*, the only species yet introduced, is an interesting stove plant. For culture, *see* **Goodyera.**

H. discolor (two-coloured). *fl.* white, ⅜in. across; spike erect, furnished with a number of crimson bracts. November. *l.* ovate, few, green above, crimson underneath. *h.* 1ft. South China, 1815. (B. R. 271; B. M. 2055, under name of *Goodyera discolor*.)

HÆMATOXYLON (from *haima*, *haimatos*, blood, and *xylon*, wood). Logwood. ORD. *Leguminosæ*. A monotypic genus. The species is a stove evergreen tree, with unarmed branches, or with spines under the leaves. It succeeds in a mixture of sand and peat. Rather firm cuttings of young shoots will root in sandy soil, under glass, and in heat.

Hæmatoxylon—*continued.*

H. campechianum. Campeachy Wood. *fl.* yellow, produced in axillary racemes. *l.* abruptly pinnate, in fascicles; leaflets small, obovate, obcordate. *h.* 20ft. to 40ft. Central America, Columbia, and the West Indies, 1724. This plant yields the well-known logwood of commerce, largely employed by calico-printers, dyers, and hat-makers. It consists of the heart-wood of the tree, from which the sapwood has been removed, and is of a deep, dull, brownish-red colour. (B. M. Pl. 86.)

HÆMODORACEÆ. An order of epigynous monocotyledons, belonging to Lindley's Narcissal alliance of endogens. Perennial herbs, natives of the Cape, North and South America, Central and Eastern Asia, and South-west Australia. Perianth petaloid, tubular or sub-campanulate, usually hairy or woolly outside, glabrous within. Leaves alternate, usually distichous, sub-ensiform, sheathing at the base, equitant. Bitterness exists in some of the plants. The roots of some also yield a red colour: hence the name of the order. As understood in the "Genera Plantarum," there are twenty-six genera and about 120 species. Well-known genera are: *Anigosanthus, Hæmodorum,* and *Wachendorfia.*

HÆMODORUM (from *haima,* blood, and *doron,* a gift; probably in reference to the roots serving as food for the natives of Australia. The name was given by Theophrastes to the Broom-rape). Bloodroot. ORD. *Hæmodoraceæ.* A genus of about seventeen species of pretty greenhouse perennials, all natives of Australia, with black, red, livid green, or orange-coloured flowers. They thrive in peat and loam. Increased by dividing the roots, in spring. The two species described below are those best known to cultivation.

H. planifolium (flat-leaved). *fl.* livid-purple or greenish at the base, in short forked racemes or cymes, collected in a compact, more or less corymbose panicle; perianth segments linear or linear-lanceolate. August. *l.,* lower ones grass-like, flat; upper ones few and short. Stems 2ft. to 3ft. high. 1810. (B. M. 1610.)

H. teretifolium (terete-leaved). This closely resembles *H. planifolium,* but the leaves are from a short sheathing base, very long, slender, and terete, or nearly so. August. 1822.

HAGBERRY. *See* **Cerasus Padus.**

HAIRBELL. *See* **Harebell.**

HAIR GRASS. *See* **Aira.**

HAKEA (named after Baron Hake, a German patron of botany). SYN. *Conchium.* ORD. *Proteaceæ.* A large genus (ninety-five species have been described) of greenhouse evergreen shrubs or rarely small trees, limited to Australia. Flowers hermaphrodite, in pairs; perianth irregular or rarely regular, the tube revolute or curved under the limb, or rarely straight. Leaves alternate, very diversified in shape, flat or terete; margins rarely recurved, and the two surfaces usually similar and equally veined. Hakeas thrive in a compost of two parts peat and one of loam, with sufficient sand to secure perfect drainage. Well-ripened cuttings will root in sandy peat, under a bell glass, if first placed in a cool house, and transferred to a mild bottom heat so soon as a callus is formed. During summer, when the plants are growing, water may be freely given in early morning or evening; at other times, it should be carefully administered.

H. conchifolia (shell-leaved). A synonym of *H. cucullata.*

H. cristata (crested). *fl.* white, small, in short axillary racemes. June. *l.* cuneate-obovate, spinosely toothed, glabrous. *h.* 6ft. to 8ft. 1837.

H. cucullata (hooded).* *fl.* red, small, showy, in dense axillary clusters. June. *l.* leathery, cordate, alternate, sessile, minutely toothed, milky-green. Branches round, very hairy. *h.* 4ft. 1824. SYNS. *H. conchifolia* and *H. Victoriæ.* (B. M. 4528.)

H. Cunninghami (Cunningham's). *fl.,* racemes lateral on the old wood, loosely cylindrical, 3in. to 6in. long. May. *l.* terete, rigid, mostly above 1ft. long. *h.* 12ft. to 16ft. A small tree. SYN. *H. longifolia.*

H. dactyloides (finger-like).* *fl.* white, very small, numerous, in axillary clusters or short racemes; perianth glabrous. July. *l.* from linear-lanceolate to oblong-lanceolate, acute or scarcely obtuse, tapering into a short petiole, rigid, prominently three-nerved. Branches erect. *h.* 7ft. 1790. Shrub. SYN. *Conchium dactyloides.* (B. M. 4528.)

Hakea—*continued.*

H. ferruginea (rusty). *fl.* small, in axillary clusters; perianth glabrous, much revolute; limb ovoid. May. *l.* glabrous or villous, sessile, from cordate-ovate to ovate-lanceolate, shortly acuminate, with a callous point, entire, or with slightly sinuate or undulate margins. Branches tomentose-pubescent. *h.* 3ft. to 4ft. SYN. *H. repanda.* (B. M. 3424; L. B. C. 1750; S. F. A. 45.)

H. florida (flowery). *fl.* white, very small, in axillary clusters. July. *l.* sessile or nearly so, lanceolate or linear-lanceolate, very acute and pungent-pointed, bordered by a few prickly teeth or small lobes. Branches pubescent or villous. *h.* 5ft. to 6ft. 1803. (B. M. 2579.)

H. linearis (linear). *fl.* white, small, in axillary clusters or short racemes; perianth glabrous; tube slender. May. *l.* sessile, linear-lanceolate, pungent-pointed, entire or bordered by a few small prickly teeth. *h.* 4ft. 1824. An erect, bushy, bright green, glabrous shrub. (B. R. 1489; S. F. A. 43.)

H. longifolia (long-leaved). A synonym of *H. Cunninghami.*

H. myrtoides (Myrtle-like). *fl.* red, in axillary clusters. February. *l.* sessile, ovate or sub-orbicular, pungent, marginate, smooth. Branches rather loosely villous, at length glabrous. *h.* 2ft. to 3ft. 1849. (B. M. 4643.)

H. nitida (shining).* *fl.* white, small, numerous, in axillary racemes. June. *l.* obovate-oblong, or rarely lanceolate, sometimes quite entire and obtuse, with a small pungent point, sometimes acute, pungent-pointed, and irregularly bordered by a few prickly teeth or lobes. Branches glabrous. *h.* 6ft. to 8ft. 1803. A dense shrub. (B. M. 2246.)

H. pectinata (comb-like). A synonym of *H. suaveolens.*

H. propinqua (related). *fl.* very small, in little axillary clusters. June. *l.* crowded, terete, smooth, mucronate, rather thick, shortly attenuated at the base. Branches scarcely pubescent. A bushy shrub.

H. pugioniformis (dagger-formed). *fl.* few, in axillary sessile clusters; perianth tube slender. May. *l.* terete, smooth, rigid, with a short pungent point. Branches glabrous or very minutely silky-pubescent. *h.* 2ft. to 4ft. 1796. (L. B. C. 353.)

H. repanda (repand). A synonym of *H. ferruginea.*

H. saligna (Willow-like). *fl.* small, in dense axillary clusters; perianth glabrous. April. *l.* usually lanceolate, obtuse, or with a short, callous point, veinless, or obscurely and obliquely penni-veined. *h.* 7ft. 1791. A tall bushy shrub. (S. F. A. 27.)

H. suaveolens (sweet-smelling).* *fl.* white, racemose, smooth. Summer. *l.* furrowed above, pinnatifid, occasionally undivided. *h.* 4ft. 1803. SYN. *H. pectinata.*

H. sulcata (furrowed-leaved). *fl.* small, in dense axillary clusters, the small rachis densely villous. May. *l.* linear-terete, angular, and furrowed, rigid, mucronate, sometimes pungent-pointed. *h.* 5ft. to 6ft. 1820. An erect shrub.

H. s. scoparia (broom-like). *fl.* yellow. May. *l.* mostly longer, sometimes 8in., less pointed than in the type, but occasionally short in some branches. 1849. (B. M. 4644.)

H. Victoriæ (Queen Victoria's). A synonym of *H. cucullata.*

HALESIA (named after Stephen Hales, 1677-1761, author of a famous work on "Vegetable Statics"). Silver-Bell or Snowdrop Tree. SYN. *Pterostyrax.* ORD. *Styracaceæ.* A genus containing about half-a-dozen species of ornamental hardy deciduous small trees, of which three are North American, one Chinese, and two or three from Japan. Flowers white, showy, drooping, on slender pedicels, in fascicles (or rarely very short racemes) from the axils of the fallen leaves of the preceding year. Leaves rather large, ovate-oblong, acuminate, more or less denticulate, slender-petioled. The species are well suited for shrubberies and lawns, in almost any position; but one somewhat sheltered is most suitable, and a deep, sandy, moist soil is best. Increased by layers, or by cuttings of the roots, in spring and autumn.

H. corymbosa (corymbose). *fl.* white, tinted with rose or yellow, in corymbose panicles. June. *l.* rounded at the base, ovate-cuspidate, sharply-serrated, hairy. *h.* 10ft. to 12ft. Japan. SYN. *Pterostyrax corymbosum.* (S. Z. F. J. 47.)

H. diptera (two-winged). *fl.* white. Spring. *fr.* with two large opposite wings and two obsolete ones. *l.* large, ovate, acute, serrated. *h.* 10ft. North America, 1758. SYN. *H. reticulata.* (L. B. C. 1172.)

H. hispida (hairy).* *fl.* white, in corymbose racemes. *fr.* covered with stiff and dense hairs. *l.* large, cordate, on stout petioles. Japan, 1875. SYN. *Pterostyrax hispidum.* See Figs. 166 and 167.

H. parviflora (small-flowered). *fl.* white, drooping; racemes panicled. May. *fr.* clavate, slightly four-winged. *l.* ovate-oblong, acute, nearly entire, downy, glaucous beneath. *h.* 10ft. Georgia and Florida, 1802.

H. reticulata (reticulated). A synonym of *H. diptera.*

Halesia—*continued.*

H. tetraptera (four-winged).* *fl.* pure white, nine or ten in a fascicle, drooping, somewhat resembling those of the Snowdrop. Spring. *fr.* four-winged, 1in. to 2in. long. *l.* ovate-lanceolate, acuminated, sharply serrated. *h.* 15ft. to 20ft. North America, 1756. (B. M. 910; L. B. C. 1173.)

FIG. 166. FLOWERING BRANCH AND DETACHED FLOWERS OF HALESIA HISPIDA.

FIG. 167. PORTION OF FRUITING BRANCH OF HALESIA HISPIDA.

HALIMIUM. Included under *Cistus.*

HALIMODENDRON (from *halimos*, maritime, and *dendron*, a tree; the plant grows in dry, naked, salt-fields, in Siberia). Salt-tree. ORD. *Leguminosæ.* A monotypic genus. The species is a very pretty, silky, hardy deciduous shrub, forming a handsome plant when grafted upon the Laburnum as a standard. It thrives in a sandy soil, and may be increased freely by seeds, by cuttings, or by layers.

Halimodendron—*continued.*

H. argenteum (silvery).* *fl.* purplish, rather large, umbellate, axillary, or fascicled on the old nodes. May to July. *l.* hoary, abruptly pinnate, with two pairs of leaflets. *h.* 4ft. to 6ft. Asiatic Russia, 1779. (B. M. 1016, under name of *Robinia Halimodendron.*)

HALLERIA (named after Albert Haller, 1708-1777, author of "Stirpes Helveticæ," and other botanical works). ORD. *Scrophularineæ.* A genus containing about five species of ornamental greenhouse evergreen glabrous shrubs, of which one is from Abyssinia, another from Madagascar, and the rest from the Cape of Good Hope. Flowers scarlet; cymes terminal, few-flowered; calyx cup-like, bell-shaped, with three to five broad, short lobes; corolla tubular, widening upwards, with an oblique, shortly five-lobed limb. Leaves ovate or oblong. Hallerias thrive in light, rich soil. Propagated by cuttings, which will root freely under a glass. Plenty of water is needed during summer, and a well-ventilated spot is at all times necessary. The species described below is the one usually seen in cultivation.

H. lucida (shining). African Honeysuckle. *fl.* reddish, large, drooping; corolla bilabiate. June. *l.* ovate, acuminate, serrated. *h.* 4ft. to 6ft. Cape of Good Hope, 1752. (B. M. 1744.)

HALLIA (named in honour of Bergen Martin Hall, a pupil of Linnæus). ORD. *Leguminosæ.* A genus containing six species of erect or decumbent greenhouse perennial herbs or sub-shrubs, all natives of South Africa. Flowers purple, small, axillary, solitary. Leaves alternate, simple, very entire, often black-dotted, two-stipuled. The best-known species is *H. imbricata.* For culture, *see* **Alhagi.**

H. imbricata (imbricated). *fl.* purple, axillary, sessile. August. *l.* cordate-ovate, convolute, imbricated. *h.* 1½ft. 1812. (B. M. 1850, 2596.)

HALORAGEÆ. An order of herbs or under-shrubs, rarely annual, aquatic, or terrestrial. Flowers often axillary, solitary, or aggregate, sometimes whorled in a spike, rarely pedicelled, sometimes panicled. Leaves usually opposite or whorled, simple, entire or toothed, the submerged ones usually pectinate, rarely entire; stipules none, or (in *Gunnera*) adnate to the petiole. The species are sparingly dispersed throughout the world, and may be found in damp places, ditches, and small streams, sometimes submerged. There are nine genera and eighty species. Well-known examples are: *Gunnera* and *Hippuris.*

HALTICA CONCINNA and **H. NEMORUM.** *See* **Turnip Fly.**

HAMAMELIDEÆ. A small order of shrubs or small or large trees, inhabiting temperate and sub-tropical Asia, South Africa, and North America. Calyx four-partite, more or less adnate to the ovary; limb truncate or five-lobed; lobes valvate or imbricate. Leaves alternate, petioled, simple, penninerved; stipules deciduous. There are about fifteen genera and thirty species. Examples: *Bucklandia, Corylopsis, Hamamelis,* and *Liquidambar.*

HAMAMELIS (from *hama*, with, and *melon*, fruit; the fruit accompanies the flower). Witch-hazel. ORD. *Hamamelideæ.* A genus containing three species of hardy deciduous shrubs or small trees, one from the United States, the others from Japan. Flowers yellow, two to three bracteolate, glomerate. Leaves alternate, sub-rotundate, unequal at the base, crenate-dentate. *H. virginica,* the species best known in gardens, thrives in a moist sandy soil, and may be propagated by layers. During autumn and winter, the plant is profusely covered with its fine rich yellow flowers, which begin to expand

Hamamelis—*continued.*

before the leaves of the previous summer drop off, and continue on the bush throughout the winter; after the petals drop off, in spring, the persistent calyces remain on till the leaves reappear in April or May.

H. arborea (tree-like).* *fl.*, petals clear rich primrose-yellow; calyces deep claret. Winter. Japan, 1862. This plant differs from the American species in forming a small tree, 15ft. to 20ft. high, and in its larger and finer flowers. (G. C. n. s., i., 187; B. M. 6659, under name of *H. japonica.*)

H. japonica (Japanese). *fl.* lemon-yellow. A form with paler flowers, and of much dwarfer habit than *H. arborea. H. Zuccariniana* is an allied form, with pale petals and a greenish-brown calyx.

H. virginica (Virginian).* *fl.* yellow, disposed in axillary clusters. October to February. *l.* obovate, acutely toothed, alternate, on short petioles. North America, 1736. Shrub. The seeds of this plant contain a quantity of oil, and are edible; the bark and leaves are astringent. (B. M. 6684.)

HAMATO-SERRATE. Serratures having a somewhat hooked form.

HAMELIA (named after Henry Louis du Hamel du Monceau, 1700-1782, a celebrated French author). ORD. *Rubiaceæ.* A genus containing six or eight species of handsome, ornamental, free-flowering evergreen stove shrubs, natives of tropical and sub-tropical America. Flowers yellow, reddish or scarlet, in di- or trichotomous cymes, sessile or shortly pedicellate; bracts minute. Leaves opposite or three to four nate, verticillate, petiolate, membranaceous, ovate oblong, and acute at both ends. Hamelias succeed best in a compost of sandy peat and fibrous loam. Nearly ripened cuttings will root during the early part of summer, inserted in sand, under glass, with bottom heat. The two species here described are those usually seen in stoves.

H. patens (spreading). *fl.* almost scarlet; cymes di-trichotomous, disposed in a terminal pedunculate umbel. Summer. *l.* three in a whorl, oval-oblong, pubescent. *h.* 5ft. to 10ft. South America, 1752. (B. M. 2533.)

H. ventricosa (swollen). *fl.* yellow, almost 1in. long, campanulate, ventricose, on long pedicels; racemes terminal. September. *l.* three in a whorl, glabrous, oval-oblong. *h.* 8ft. South America, 1778. (B. M. 1894; B. R. 1195.)

HAMILTONIA (named after William Hamilton, an eminent American botanist). SYN. *Spermadictyon.* ORD. *Rubiaceæ.* A genus comprising three or four species of ornamental stove evergreen shrubs, natives of tropical and sub-tropical India, China, and the Indian Archipelago. Flowers white or blue, fascicled or umbellate; corolla funnel-shaped. Leaves opposite, ovate-lanceolate, shortly petioled. A loam and peat compost is most suited to Hamiltonias. Half-ripened cuttings root freely in sand, under a glass, with a moist bottom heat.

H. scabra (rough). *fl.* azure-blue, deliciously fragrant; inflorescence densely villous. November to March. *l.* ovate-lanceolate, short-acuminated, scabrous on both surfaces. *h.* 4ft. to 6ft. Nepaul, 1823. SYN. *Spermadictyon azureum.* (B. R. 1235.)

H. spectabilis (showy). *fl.* lilac-blue, in large, much-branched panicles, agreeably scented. Winter. *l.* ovate-lanceolate, green and smooth above, paler and rough beneath. *h.* 4ft. to 6ft. (R. H. 1872, 191.)

H. suaveolens (sweet-smelling). *fl.* pure white, sessile, in terminal corymb-formed heads, very fragrant. October. *l.* broad-lanceolate, 3in. to 6in. long. *h.* 4ft. to 6ft. India to China, 1818. (B. R. 348.)

HAMMER, GARDEN. Hammers are principally used in gardening for nailing wall trees. The head should be rather short, and quite flat at the end used for

FIG. 168. GARDEN HAMMER.

driving nails. The other end should be shaped like a claw, and turned back sufficiently to serve as a fulcrum for drawing out nails that are useless or misplaced. See Fig. 168.

HAMULOSE. Covered with little hooks.

HANCORNIA (a commemorative name). ORD. *Apocynaceæ.* A monotypic genus. The species is a small, loosely or pendulously branched tree, from Brazil. For culture, *see* **Tabernæmontana.**

H. speciosa (showy). *fl.* sweet-scented, resembling those of Jasmine; cymes terminal, few-flowered, shortly pedunculate. *fr.* yellow, marked with red spots, about the size of a plum, edible. *l.* opposite, small, oblong, sharp at the base, and rounded, but shortly pointed at the apex, penniveined. *h.* 20ft. The tree yields a milky juice, which, when exposed to the air, hardens into a kind of caoutchouc.

HAND BARROW. *See* **Barrow.**

HAND GLASSES. These are very useful as temporary coverings for plants that are too tender for being fully exposed. They are also utilised in propagating various subjects, as the top part may be readily removed and easy access thus secured for attending to whatever is inside. Various shapes are made, the bases being generally square, hexagonal, or octagonal. The first-named is the most con-

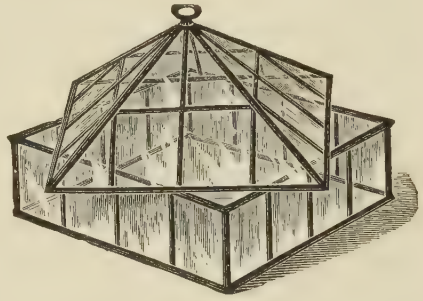


FIG. 169. HAND GLASS.

venient shape (see Fig. 169), and if the framework is constructed with copper or cast iron and kept painted, it lasts a long time, and answers well. Air may be admitted by tilting up the movable top, or the latter may be taken off and replaced at will. Hand Glasses, when employed for propagating purposes, should be glazed airtight, by having the glass fitted into the framework without laps.

HAND-PLANT. *See* **Cheirostemon.**

HAND-WEEDING. The necessity of Hand-weeding is now obviated, in a considerable degree, by the general insertion of seeds in lines, and the occasional passing of the hoe between them. This only misses a few weeds by the sides of plants that may readily be removed when thinning takes place; whereas, under the old system of sowing broadcast, whole seed beds of any description had to be Hand-weeded, to prevent the proper plants from becoming smothered. Hand-weeding gravel walks should be practised after a storm, if there are any weeds about, as they may then be easily pulled up and destroyed.

HANGING. A term applied to plants or cuttings when only partially inserted in holes, previously made by a dibber, the ends not being placed in contact with the earth at the base. It is very important that Hanging should be avoided, especially with cuttings; failure to emit roots, under such conditions, being almost a certainty.

HAPLOPAPPUS (from *haploos*, simple, and *pappos*, down; in reference to the absence of the outer pappus). SYN. *Aplopappus.* ORD. *Compositæ.* A genus containing sixty species of perennial herbs or sub-shrubs, natives of North America, from California to Texas and Mexico, Chili and Patagonia. Flower-heads yellow, large or medium; pappus often reddish, rarely white; achenes glabrous or silky-villous. Leaves alternate, entire, or rigidly ciliate-dentate, rarely pinnatifid. *H. spinulosus*, perhaps the only species yet in cultivation, is a very ornamental sub-shrub, of easy culture in ordinary garden soil. It may be increased by divisions, or by seeds.

Haplopappus—*continued.*

H. spinulosus (spiny). *fl.-heads* bright golden yellow, 1in. or more across. August. *l.* hoary, deeply pinnately cut into linear segments. *h.* 6in. to 18in. Rocky Mountains, 1874. (B. M. 6302.)

HAPLOPHYLLUM. Now included under **Ruta** (which *see*).

HARDENBERGIA (named in honour of the Countess of Hardenberg, sister to Baron Huegel, the celebrated traveller). ORD. *Leguminosæ.* A small genus (three species have been described) of greenhouse, glabrous, twining herbs or under-shrubs, limited to Australia. Flowers violet, white, or pinkish, with a yellowish or greenish spot on the standard; in axillary racemes. Leaves of one, three, or five entire stipelate leaflets. The species succeed in a compost of two parts peat and one loam, with the addition of a little sand and charcoal, to keep the soil open. Propagated by seeds, or by cuttings, made of firm young side shoots in April, inserted under a bell glass, and placed in a warm frame or pit, without bottom heat. Hardenbergias are well adapted for planting out, and training up rafters in a greenhouse, where there is a little shade in summer, and a temperature of 40deg. to 45deg. in winter.

H. Comptoniana (Compton's).* *fl.* closely resembling those of *H. monophylla* in size, colour, and structure; in pairs or clusters of three or four along the racemes. March. *l.*, leaflets three or five, varying from ovate to linear-lanceolate, rather obtuse, rounded or truncate at the base. 1803. SYNS. *H. digitata* (B. R. 1840, t. 60), *H. Huegelii*, *H. Lindleyi*, *H. Makoyana*, *Glycine Comptoniana* (A. B. R. 602; B. R. 298), *Kennedya macrophylla* (B. R. 1862).

H. cordata (heart-shaped). A synonym of *H. monophylla.*

H. digitata (digitate). A synonym of *H. Comptoniana.*

H. Huegelii (Huegel's). A synonym of *H. Comptoniana.*

H. Lindleyi (Lindley's). A synonym of *H. Comptoniana.*

H. Makoyana (Makoy's). A synonym of *H. Comptoniana.*

H. monophylla (one-leaved).* *fl.* purple, usually numerous, in pairs or rarely three together, the upper racemes often forming a terminal panicle. April. *l.*, leaflets always solitary, usually ovate or lanceolate, more or less cordate or rounded at the base, often coriaceous and strongly reticulate, but varying from broadly cordate-ovate to narrow-lanceolate. 1790. SYNS. *H. cordata*, *H. ovata*, *Glycine bimaculata* (B. M. 263), *Kennedya cordata* (B. R. 944), *K. longiracemosa* (L. B. C. 1940), *K. monophylla* (B. R. 1336; L. B. C. 758), *K. ovata* (B. M. 2169).

H. ovata (ovate). A synonym of *H. monophylla.*

HARDENING-OFF. This refers to the process of gradually inuring plants to a cooler temperature, after they have been subjected to heat, either for the encouragement of growth, for propagating purposes, or for forcing. It is most largely practised in spring, with bedding and other plants, that are to be cultivated throughout the summer in the open air. To avoid sudden checks to tender foliage or flowers, it is important that Hardening-off should be conducted by gradual steps, in preference to direct changes from high to low temperatures.

HARDWICKIA (named after General Hardwicke, once of the East Indian Company). ORD. *Leguminosæ.* A genus containing three species of stove evergreen trees. Flowers small, racemose; racemes slender, paniculate. Leaves abruptly pinnate, one to three-jugate, coriaceous. Hardwickias thrive in a rich sandy loam. Ripened cuttings will root in sand, in a brisk heat.

H. binata (twin-leaved). *fl.* yellow, in axillary and terminal panicles. *l.* with one pair of leaflets; leaflets opposite, obliquely ovate, semi-cordate. *h.* 100ft. India, 1818. This species yields an excellent timber. (B. F. S. 26.)

H. pinnata (pinnate). *fl.* dirty yellow. *l.*, leaflets alternate, ovate-lanceolate, acuminate, one-nerved in the middle, the ultimate one almost terminal. *h.* 40ft. to 50ft. India 1818. (B. F. S. 255.)

HARDY PLANTS. Although this title may refer to all plants sufficiently hardy to withstand the winters of our variable climate unprotected, it more particularly applies to those which are herbaceous and of various heights, and to others of dwarf dimensions introduced

Hardy Plants—*continued.*

from alpine regions. They may, in either case, be of annual, biennial, or perennial duration. A collection of Hardy Plants should form part of the occupants of every garden. The treatment of many of the most popular and useful is of the easiest description, provided due preparation be made in the first place, and ordinary attention bestowed afterwards in keeping the borders cleaned and the cultivated plants properly tied up, to protect them from rough winds. A large number of species of this class of plants are of botanical interest only; but, apart from these, a numerous selection, unsurpassed in beauty and usefulness when in flower, may be obtained for garden embellishment. Some are well adapted for massing in large or small beds, according to the several habits of plants so employed; the majority, however, most suitable for cultivation in private gardens may be better arranged in mixed borders, reserving the dwarf and more delicate kinds for special culture, if possible, on rockwork. A general display at any particular season is not usually the rule with Hardy Plants of a varied description, if we except that made by Narcissi and numerous other bulbs in spring. The flowering period of a mixed collection extends, with one or another genus, nearly throughout the year; spring and autumn being the seasons when most are represented—their requirements being more fully met by a somewhat cooler temperature and moister atmosphere than those experienced in summer. Various select perennials, grown in quantity, afford an invaluable supply of cut blossoms, especially in early autumn, when there is a scarcity, under glass, of flowers adapted for cutting. Their culture is a matter of great importance for this purpose alone. A large number of Hardy Plants, particularly the bulbous section, flower very early in spring, and these are additionally attractive on that account. We are indebted to the latter, and to a selection of hardy annuals and perennials, for furnishing flower beds in spring, and making them interesting, long before it is possible to plant the summer occupants. Spring gardening deserves considerably more attention than it at present receives; at least, in localities where the climate is favourable, and where there is room in the reserve ground for the preparation of plants. Some few gardens have a space specially set apart for hardy spring flowers, in which the latter are kept all the summer, and invariably succeed much better for not being much disturbed. Hardy bulbs, planted permanently, may be left alone with advantage, in such positions; and annual or perennial plants can be renewed as becomes necessary. A number of plants for spring gardening may be propagated annually from seed, or by division of old plants, in autumn, according to the different habits, or period of duration, belonging to each. Hardy spring-flowering subjects, such as Myosotis, Primroses, Polyanthus, Silenes, and Wallflowers, in variety, should be sown during the middle or latter part of summer, and be prepared, in the open ground, for placing out permanently in autumn. Dwarf perennials secured in quantity for associating with these, are: *Alyssum saxatile*, *Arabis albida* and its variegated variety, Aubrietias, Daisies, and dwarf species of Phlox. All these latter may be divided, and the stock largely increased, if desired, after flowering is over, or, better still, in August, on account of dry, hot weather. In geometrical summer flower gardening, perennials can scarcely be appropriately introduced; but, where bedding is of a mixed description, suitable positions may frequently be found for whole beds or masses of such plants as *Anemone japonica alba*, some of the dwarf species of Aster, Border Carnations, tall-growing Lobelias, Pentstemons, Phloxes, Pyrethrums, &c. These are all attractive in their flowering seasons, and materially reduce the supply of more tender subjects, by filling the space in their stead. The majority of Hardy Plants may be readily raised from seeds, which may be sown in pots, and placed in a frame with a very slight heat, from the month of February throughout the summer; or they may be sown outside,

Hardy Plants—*continued.*

after the middle of March, when germination is tolerably certain. Forwarding in frames sometimes has advantages; but it is important that the young plants thus treated be fully exposed to light, and not allowed to become drawn for want of air. A large proportion of perennials may be more readily propagated by division, and this is best performed early in autumn, or at the commencement of new growth in spring.

Preparation and Planting of Mixed Borders. In the preparation of a border for Hardy Plants, it is important that the soil be deeply trenched, so far as it will allow, the autumn previous to planting. If it is moderately rich and heavy, rather than light and sandy, it will be all the better, as many of the vigorous-growing species require a strong soil. Manure should be added at trenching time, to insure its proper incorporation amongst the soil; and, if the surface is laid rough for the winter, the border will be in good condition for planting early the following spring. Herbaceous subjects, in general, are not well suited for planting alone in a border. Mixed borders should not be less than 10ft. or 12ft. wide, and a greater width allows of a better arrangement being provided for the taller-growing sorts. Evergreen shrubs, planted irregularly according to their height, are advisable for permanently furnishing the border in winter, when the primary plants have died down, and they also afford protection from wind and strong sunshine in summer. The object in planting should be to dispose of the different colours, varieties, heights, &c., of the material at command, so that the whole shall prove equally interesting at all seasons, without a frequent repetition of similar effects in different parts. A knowledge of the habit, height, time of flowering, and other points in connection with the various plants employed, will be requisite on the part of the cultivator, to enable him to fix proper positions for each, so that a gradual rise in the heights is secured, at flowering time, from the front line to the back. This cannot always be secured during the first season, on account of the nature of the soil, and its effect on the growth of different plants; but any that are misplaced may be marked, and the error remedied the following season. Tall Asters, Delphiniums, Helianthus, &c., should be planted near the back; other plants, reaching a height of 2ft. to 3ft., placed about the middle; and dwarf ones, such as Aubrietias, Iberis, Pinks, Saxifrages, &c., near the front margin. Mixed borders may be utilised for the cultivation of an endless variety of plants in summer. Spring bulbs may be inserted at intervals, and allowed to take care of themselves; their positions should be marked by sticks or labels, to avoid injury being caused when the tops cannot be seen. Vacant spaces may be utilised for seeds of annuals, either hardy or tender, and these may be sown where the several heights will correspond, at the latter end of March. The general keeping of the mixed border consists in frequently tying up any tall-growing plants that require it; but only those of an erect-growing habit should be thus treated, the stakes not being allowed to exceed the height of the plants, and inserted so as to be hidden by the foliage as much as possible. In moderately heavy soils, watering will not be much required; but, where the ground is light, almost any quantity may be applied in summer. The usual method of annually digging mixed borders, is not to be recommended, as many plants are surface-rooting, and are, consequently, much injured by the process: a slight forking over, to break the surface, and an addition of some leaf soil or light manure, about March, are beneficial. Sufficient space should be allowed each plant without overcrowding, and any subjects which spread beyond their limits—some of the Asters, for instance—should be considerably reduced each year. If alpines are introduced, they should be kept to the front line, and stones placed round them, to keep the crowns above the ground line, and special soil added round their roots.

Hardy Plants—*continued.*

A large number of these interesting dwarf plants may be successfully grown in mixed borders, if a little extra attention is bestowed on their cultivation, especially in raising the crowns somewhat, to prevent their damping off.

Hardy Aquatic and Bog Plants. Numerous beautiful Hardy Plants succeed best in a very moist situation, and many require entire submersion in water. Where a pond or lake exists, advantage should be taken for providing some accommodation for them, and planting accordingly; or artificial preparation may be made for a limited quantity. Bog plants should, in most cases, have their crowns kept a little above the surface. They may either be planted out, or grown in pans, and plunged. Hardy aquatics, such as *Aponogeton distachyon*, *Nuphar advena* and *N. lutea*, *Nymphæa alba* and *N. odorata*, with several others, may be planted where there is a considerable space and depth of water. *Calla palustris*, *Iris pseudacorus*, *Lythrum Salicaria*, and *Sagittaria sagittifolia*, are examples of such as succeed near the edge, or in shallow water. Amongst others worthy of culture, and which succeed in moist, boggy situations, are: *Anagallis tenella*, *Caltha palustris* and its double form, Droseras, *Parnassia palustris* and other species, *Primula rosea*, *Sarracenia purpurea*, and *Spiræa palmata*.

HAREBELL. A name given to **Campanula rotundiflora** and **Scilla nutans** (which *see*); also spelt Hairbell.

HARE'S EAR. *See* **Bupleurum.**

HARE'S FOOT. *See* **Ochroma Lagopus.**

HARE'S-FOOT FERN. *See* **Davallia canariensis.**

HARE'S TAIL. *See* **Lagurus ovatus.**

HARICOT. The ripe seeds of *Phaseolus vulgaris* and other species of *Phaseolus*.

HARINA. *See* **Wallichia.**

HARONGA (the native name in Madagascar). ORD. *Hypericineæ*. A monotypic genus. The species is an evergreen stove shrub. It thrives in a compost of sandy loam and peat. Propagated by cuttings, made of young shoots, and inserted in sand, under a glass, in heat.

H. madagascariensis (Madagascar). *fl.* yellow; corymbs terminal, very large and branchy. *l.* elliptic-lanceolate, entire. Stem round, branching. *h.* 10ft. Tropical Africa and Madagascar, 1822.

HARPAGOPHYTUM (the English name—Grapple Plant—translated into Greek). SYN. *Uncaria*. ORD. *Pedalineæ*. This genus comprises about four species of procumbent canescent perennial herbs, natives of South Africa and Madagascar. Flowers axillary, solitary, shortly pedicellate; pedicels glandular at base. Leaves opposite or alternate, incised.

H. procumbens (procumbent). *fl.*, corolla tube pale; limb purple. *l.* stalked, five-nerved, palmatifid, with coarsely-incised sinuate lobes. Stems many, prostrate. Cape of Good Hope. A very handsome herb, with large fruit, beset with long branches armed with powerful hooked spines; but probably not in cultivation in this country. SYN. *Uncaria procumbens*.

HARPALIUM. Now included under **Helianthus** (which *see*).

HARRACHIA. *See* **Crossandra.**

HARRISONIA. This genus is now included, by the authors of the "Genera Plantarum," under **Marsdenia** (which *see*).

HARTOGIA (named in honour of J. Hartog, an early Dutch traveller in South Africa and Ceylon). SYN. *Schrebera*. ORD. *Celastrineæ*. A monotypic genus. The species is an ornamental greenhouse evergreen shrub, allied to *Cassine*. It proves hardy in sheltered spots. For culture, *see* **Cassine.**

H. capensis (Cape). *fl.* yellow; pedicels few-flowered, axillary, drooping. June. *l.* opposite, oblong, crenated, smooth, hardy, stalked. Cape of Good Hope, 1800. A small tree.

HARTSTONGUE. *See* **Scolopendrium.**

HARTWEGIA (named after Theodor. Hartweg, once a botanical collector for the Horticultural Society). ORD. *Orchideæ*. A genus containing about a couple of species of curious little stove epiphytal orchids, closely allied to *Epidendrum*. For culture, *see* **Odontoglossum.**

H. gemma (twin). *fl.* brilliant amethystine-purple. *l.* thick, semi-terete, channelled, acute, blotched with blackish violet. Central America (?), 1878.

H. purpurea (purple). *fl.* purple; perianth spreading; lateral sepals drawn out at the base, adnate to the lip; lip connate with the column, ovate. August. *h.* 1ft. Mexico and Guatemala, 1837. (Ref. B. 94.)

HARTWORT. *See* **Tordylium.**

HASSAGAY OR ASSAGAY TREE. *See* **Curtisia faginea.**

FIG. 170. HASTATE LEAF.

HASTATE. Formed like the head of a halbert. A Hastate Leaf is shown at Fig. 170.

HASTINGIA. A synonym of **Holmskioldia** (which *see*).

HATCHET CACTUS. *See* **Pelecyphora.**

HATCHET VETCH. *See* **Securidaca Coronilla.**

HAULM. A term often applied to the stems of such plants as Beans, Peas, Potatoes, &c.

HAUTBOIS, or **HAUTBOY.** *See* **Fragaria elatior.**

HAW. The fruit of the Hawthorn, *Cratægus Oxyacantha*.

HAWKBIT. *See* **Leontodon.**

HAWK MOTHS. *See* **Sphingidæ.**

HAWKSBEARD. *See* **Crepis.**

HAWKWEED. *See* **Hieracium.**

HAWORTHIA (named after A. H. Haworth, a distinguished authority on succulent plants, died 1833). ORD. *Liliaceæ*. A genus of about sixty species of small, curious-looking and very interesting greenhouse succulent Aloe-like plants, all—with the exception of a single species from Angola—natives of Southern Africa. Flowers small; peduncle naked, simple or branched, loosely racemose; bracts small, persistent. Rosette leaves never pedunculate, short, broad, thick, fleshy. For culture, &c., *see* **Aloe.**

H. albicans (whitish). *fl.* about ½in. long; racemes nearly 1ft.; peduncles strong, 1ft., often branched. *l.* about thirty, dense, deltoid-lanceolate, 2½in. to 3in. long, 1in. to 1½in. broad; face slightly concave; back round, distinctly keeled. 1795. (B. M. 1452, under name of *Aloe albicans*.)

H. arachnoides (cobweb-like). *fl.* about ½in. long; raceme loose, about 1ft.; peduncles simple, nearly or quite 1ft. *l.* thirty to forty, oblong-lanceolate, 1½in. to 2in. long, scarcely more than ½in. broad, pale glaucous-green; back round, one or two-keeled. 1727. (B. M. 756, under name of *Aloe arachnoides*.)

H. atrovirens (dark-green). *fl.* about ½in. long; raceme loose, few-flowered; peduncle simple, slender, about 1ft. *l.* thirty to forty, dense, oblong-lanceolate, ½in. long, about half as much broad, dark green; face swollen; margin armed with small teeth. 1823. (B. M. 1361, under name of *Aloe arachnoides pumila*.)

H. attenuata (attenuated). *fl.* ¾in. long; raceme loose, 6in.; peduncles less than 1ft., simple or branched. *l.* thirty to forty, deltoid-lanceolate, acuminate, 2½in. to 3in. long; face flat, back swollen. Previous to 1790. (B. M. 1345, under name of *Aloe Radula*.)

H. cymbiformis (boat-formed). *fl.* ¾in. long; raceme loose, 6in. long; peduncles simple, under 1ft. *l.* twenty to twenty-five, obovate, acute, 1in. to 1½in. long, ¾in. broad, pale green; face slightly concave; back keeled upwards. 1795. (B. M. 802.)

H. fasciata (banded). *fl.* ¾in. long; raceme loose, 6in. long; peduncles nearly 1ft., simple or branched. *l.* forty to sixty, dense, ascending, deltoid-lanceolate, 1½in. long, ½in. wide; face glaucous-green, spotted; back swollen. 1816.

H. margaritifera (pearl-bearing). *fl.* ½in. long; raceme 6in. long; peduncles 1ft. or more in length, branched. *l.* thirty to forty, dense, ascending, lanceolate-deltoid, 2in. to 3in. long, about 1in. broad at base; face swollen; back round, keeled above; both sides endowed with irregular series of large pearly tubercles. 1739. SYN. *Aloe margaritifera*.

Haworthia—*continued.*

H. m. granata (grained) is a smaller-growing form, with somewhat different tubercles. (B. M. 1360, under name of *Aloe margaritifera minima*.)

H. Reinwardtii (Reinwardt's). *fl.* about ½in. long; raceme loose, few-flowered, 6in. long; peduncles simple, 6in. long. *l.* ascending, ovate-lanceolate, 1in. to 1½in. long, ½in. broad; face swollen, shining; back round; apex obscurely keeled. 1820.

H. retusa (retuse). *fl.* ¾in. long; raceme loose, 6in.; peduncles simple, less than 1ft. long. *l.* ten to fifteen, patent, oblong, acute, 1in. to 1½in. long, ¾in. broad; face swollen, bright green; apex cuspidate. 1720. (B. M. 455, under name of *Aloe retusa*.)

H. rigida (rigid). *fl.* about ½in. long; raceme loose, 6in.; peduncle 6in. to 12in., simple or branched. *l.* ovate-lanceolate, brownish-red, 1in. to 1½in. long, about ½in. broad; face concave; back round, with minute tubercles. 1795. (L. B. C. 1430, under name of *Aloe expansa*.)

H. tortuosa (twisted). *fl.* slightly over ½in. long; raceme loose, sub-secund, 6in. to 9in. long; peduncle simple or forked. *l.* spirally arranged, ovate-lanceolate, all ascending, 1½in. to 2in. long, ¾in. broad, dark green; face hollowed out; back swollen; apex subpungent. 1794. (B. M. 1337, under name of *Aloe rigida*.)

H. viscosa (clammy). *fl.* ¾in. long; raceme loose, 6in. to 9in. long, few-flowered; peduncles simple, slender, 6in. long. *l.* ascending, imbricate, ovate, acute, dark green, 1in. to 1½in. long, ½in. broad; face profoundly hollowed out; back swollen. 1727. (B. M. 814, under name of *Aloe viscosa*.)

HAWTHORN. *See* **Cratægus Oxyacantha.**

HAWTHORN CATERPILLARS. The Hawthorn, or Whitethorn, is attacked by the Caterpillars of numerous species of insects, considerably over 100 having been recorded as feeding on it; but, among these, only a few do sufficient damage to require a detailed account of their ravages. They belong to various groups of insects, and most of them are hurtful to several other plants; hence, in this place, references will be given to other headings for some of the insects named. Several belong to the *Lepidoptera*, or butterflies and moths; others to the *Tenthredinidæ*, or sawflies. The more injurious *Lepidoptera* are as follows: *Aporia Cratægi* (Black-veined White Butterfly), an insect not unlike a large Cabbage White Butterfly, but with the wing-veins black, and the wings almost semi-transparent and unspotted. The caterpillars, while young, live together in a web spun over the leaves and branches; but, when full-grown, they separate and live singly. They are then bluish-grey, with black head, legs, anal lobes, and spiracles, and three bands on the back, alternating with two yellow-brown bands. The pupæ are fixed to the branches. These insects, in some parts of England, are common enough to do harm. *Liparis chrysorrhea* (Brown-tail Moth) and *L. auriflua* (Gold-tail Moth) are thick-bodied moths, about 1½in. in spread of wing, white, with a coloured tuft of hair in the tail; and in *L. auriflua* there are dark spots on the front wings. The eggs are laid on the branches, and are covered with the coloured hairs of the tuft. The larvæ live in slender webs among the leaves; they are hairy, with tufts of coloured hairs on tubercles on certain segments. *L. auriflua*, in particular, is often common and destructive (*see* **Liparis**). Looper Caterpillars (*see* **Hybernia** and **Winter Moth**). *Hyponomeuta padella* (Small Ermine Moth), and one or two other species of the same genus, though small moths, are often so numerous as to do great injury to trees and shrubs. Fig. 171 will sufficiently indicate the appearance of the insect, and of the web spun by the larvæ for protection. The varieties of moths in the genus are much alike, their front wings being white or grey, with numerous small black dots; the lower wings are darker, and uniform. *H. padella* is scarcely 1in. in breadth of wings; the others are slightly larger. The females deposit their eggs on branches, in autumn, covering them with a gummy substance, to protect them. The larvæ emerge in spring, and, for a time, feed between the surfaces of the leaves. Afterwards, they eat the epiderm also; and subsequently spin a web in common around new leaves, on which they then feed in safety.

Hawthorn Caterpillars—*continued.*

They are smooth, have a row of dark spots on the sides, and the head is brown. The nests are often extremely conspicuous. The Sawflies that do most harm to Hawthorn are: *Dineura stilata*, *Eriocampa limacina* (*E. adumbrata*), and *Lyda punctata*. The larvæ of *Lyda* want prolegs, and feed in a web, spun over the branches. Each larva also makes a special silken case for itself (*see* **Lyda**). The larvæ of *E. limacina* eat away the upper surface of the leaves, often stripping it entirely off; and the leaves, in consequence, become marked with brown, scorched spots, or, maybe, completely killed. Frequently, great injury is done by these attacks. The larvæ usually feed in groups of three or four. They resemble small greenish-yellow slugs, covered with a slimy secretion, and are commonly known as "Slug-

FIG. 171. SMALL ERMINE MOTH AND WEB OF CATERPILLARS.

worm." Several cultivated trees are subject to their attacks. *Dineura stilata* is very similar to the last species in the mode in which the larvæ feed; but the latter are uniformly green, have the legs quite visible while on the leaves, and they emit a disagreeable smell. Further information will be given under **Sawflies** (which *see*). The best means of prevention, or of cure, in respect to these insects are as follows: Larvæ living socially in webs are easily removed and destroyed with the webs. The larvæ on the exposed leaves are readily killed by dressing the plants with the powder of Hellebore in water, or by using Paris Green. The foliage of Hawthorn is frequently mined by the larvæ of various small insects, chiefly moths, but the plants do not suffer much real injury in this way.

HAZEL. *See* **Corylus Avellana.**

HAZEL, WITCH. *See* **Hamamelis.**

HEADING, or HEARTING. A term applied to various members of the Cabbage tribe, when their central leaves cease to unfold and commence forming what is usually known as the heart. The closeness of the latter is regulated by exposure to light. Summer is favourable to Heading, even when the plants are in a young state, and winter tim) against it.

HEADING-DOWN. This applies to the severe pruning of trees and shrubs that have become overgrown. In some cases, it is practised for the encouragement of a better and cleaner growth when signs of declining vigour are apparent. Heading-down will be requisite with fruit-trees which it is intended to graft by any of the methods usually employed, except inarching.

HEARTSEASE. *See* **Viola tricolor.**

HEARTWOOD. The central part of the timber of exogens, hardened or altered by age.

HEATH. *See* **Erica.**

HEATHER. *See* **Calluna vulgaris.**

HEATH, ST. DABEOC'S. *See* **Dabœcia polifolia.**

HEATH, SEA. *See* **Frankenia.**

HEATHWORTS. A name given by Lindley to the order *Ericaceæ*.

HEATING. This, in connection with horticultural structures, is an absolute necessity for securing and regulating temperatures artificially, to suit the requirements of exotic plants; and for the production of flowers, fruits, and vegetables out of their natural season. Its effects may be derived from fermenting material placed inside the structure, or from causes which arise as the product of combustion by fire in the immediate vicinity, transmitted, by means of water or air, to wherever it is desired. These sources of heat, either used separately or in combination, afford the requisite temperatures for different plants, according as their admission is regulated to the various houses in which the latter are grown. Fermenting material evolves a considerable amount of heat, but by a slower process than combustion, as usually understood. A more genial and moist temperature may be secured from the former than from fire heat, but it cannot be so readily regulated. A fermenting mixture of litter and leaves greatly encourages the growth of young plants in spring, and is also preferable for starting early Vines and fruit-trees. It is advisable, in case of severe weather, to make provision for adding fire heat as well. Gentle hotbeds are also very useful for forcing vegetables, and for the raising of seeds generally. Heating by hot air is not adapted for horticultural purposes, on account of the consequent drying of the atmosphere being very injurious to plant life. Flues are but little better; still, means may be adopted for moistening the heated air transmitted by them, where it is impracticable with a continued influx of dry air. Both of these systems may, therefore, be dismissed in reference to all glass houses of modern construction, and one of the various methods of Heating by hot water should be, in all cases, adopted. Before proceeding to notice some of the most approved boilers for requirements on a large or small scale, it may be well to refer to the principles applied to Heating, as on these being properly understood and carried out in the construction of any hot-water apparatus, success or failure in its action materially depends. Heat always has a tendency to equalise itself, by communicating part of its properties to surrounding substances until they are raised to an equal temperature, so far as the original intensity admits. If

Heating—*continued.*

generated by the combustion of fuel inside a boiler, heat may be conveyed, by water or air, to a considerable distance; the more remote it is, the less will be the amount that reaches the further extremity. Heated air or water becomes lighter than when cold, and naturally ascends in consequence. Either may be conducted in an upward incline, or in a perpendicular or horizontal direction, but not readily downwards, on account of the disposition of all heated substances to ascend. This transmission of heat in pipes containing water is usually termed circulation, and the arrangement of the pipes throughout, to allow an unimpeded circulation, is one of the main principles of Heating, but is not sufficiently recognised in many instances. The boiler must be placed below the level of any point the heat from it is intended to reach, the upper, or flow pipe, being connected on the top. The return pipe, by which the cold water enters, should be rendered free from the action of the fire by connecting it near the base—at the front preferably—and on both sides, if this is convenient. Dips in the pipes at any point should be specially avoided, as they frequently impede free circulation—generally more so when extra heat is applied. Houses erected for various purposes may have their quantity of pipes in proportion to the heat required, and still be in connection with the same mains conducting heat to others having much higher temperatures. There are no special rules applicable, in all cases, as to how many pipes a certain house will require, so much depending on stoking, and upon the amount of heat that may be available. It is best to provide for emergencies, in the first place, by insuring a sufficiency of piping, and inserting valves in the flow and return pipes, for regulating the admission of heat. In the arrangement of a Heating apparatus, an important part should be taken by the gardener in charge, as, although the workmen employed may understand the principles on which the success of their work depends, they do not similarly understand the requirements of plants. A proper system must be adopted where there are several houses to be heated and kept at different temperatures, by one or more boilers set and connected together. Main flow and return pipes should be fixed, with a gradual rise, at a point below all others in connection, and near the central part of the distance the heat is intended to reach, so that branches may be taken on either side. All houses or pits intended for Heating separately, and irrespective of the one adjoining, should be provided with check valves near the junction with the main pipes. As heat always rises most rapidly to the highest points, it should be arranged that these are in the houses required at the highest temperatures. Pipes 4in. in diameter are those most largely used for top heat; others, only 3in., are well adapted for beds or for small houses. In houses specially devoted to plants requiring a somewhat dry atmosphere in winter — Pelargoniums, for instance—an extra 2in. pipe is sometimes fixed along the lower part of the rafters for drying the air, this being generally attended with excellent results in the production of large, clean flowers, free from damp.

Boilers. Of these, there are numerous forms in use. Some are composed of one or two series of cast-iron pipes placed in an upright or horizontal direction, and exposed to the action of the fire. Others are made of welded or wrought iron, and as they can be purchased in such a variety of sizes, and invariably answer well, their use is somewhat extensive. The more simple a boiler is in construction, and the greater surface it exposes to the direct action of fire used, the better. Tubular boilers frequently become choked with fuel amongst the pipes or tubes, and, if this is not prevented, a great loss of heat is sustained. Boilers having complicated arrangements of any sort are seldom so effective as those of a simple form, the divisions between the

Heating—*continued.*

parts in the furnace soon becoming choked with soot. The requisite size of boiler depends on its approximate Heating power, the length of pipes connected, and the amount of heat required. It is advisable to make provision, in the first place, by fixing a Heating power considerably higher than that absolutely necessary. A great deal depends on the sort of fuel used, the rapidity of draught, and the manner of stoking. The plain Saddle Boiler is well known as being one of the oldest types, but, when properly set, still amongst the most efficient. There are various modifications of it, which claim various advantages, such as economising fuel, heat, &c. One of the most useful and efficient forms is the Flue and

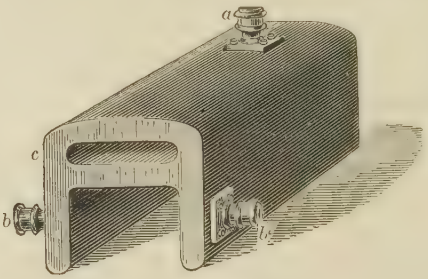


FIG. 172. FLUE AND TERMINAL END SADDLE BOILER.

a, Flow Pipe; *b*, *b*, Return Pipes; *c*, Flue.

Terminal End Saddle (see Fig. 172). It is a wrought welded boiler, made in sizes varying in length from 2ft. to 5ft., heights and transverse inside measurements being in proportion. The approximate Heating power of one of these boilers, 2ft. long, is given as 500ft. of 4in. piping; 3ft. long as 800ft.; and 5ft. long as 2000ft.; the unequal proportion, in results corresponding with length, being accounted for by the enlargement of all parts, and the variation in height and width. The flue extends nearly to the back, and through it the whole of the heat must pass from the fire. Sometimes, another flue is formed with bricks on the outside surface, as with the ordinary Saddle; at others, the whole is covered with an arch without any division. As the full surface of the boiler on both sides is exposed to heat, nearly the fullest possible amount is absorbed before reaching the chimney.

The Gold Medal Boiler (see Fig. 173), so named from that award being conferred on it after a working competition at the Birmingham Exhibition in 1872, is of wrought iron, and virtually a flued Saddle with a terminal end, the flue being in the form of three chambers instead of one,

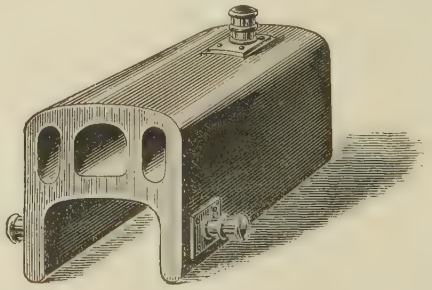


FIG. 173. THE GOLD MEDAL BOILER.

as in that previously noticed. This boiler maintains a high position, and a large number are in use. Various sizes are made, ranging from 2ft. to 6ft. long, and proportionately large in all parts. The approximate Heating power of one 2ft. long, is 500ft.; that of 4ft., 1700ft.; and that of 6ft. in length, 3500ft.—all of 4in. piping.

Heating—*continued.*

Another modification of a saddle boiler is the Cruciform (see Fig. 174). It combines great Heating power with economy of fuel; the formation of its flues, in the

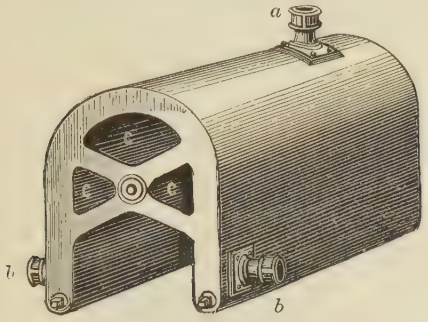


FIG. 174. CRUCIFORM SADDLE BOILER.

a, Flow Pipe; *b*, *b*, Return Pipes; *c*, *c*, *c*, Triangular Flues.

shape of a cross, being such as conduces to a free circulation of water, without the disadvantage of resting-places being in them for sediment. Approximate Heating power is much the same as in the Gold Medal Boiler.

The Climax is a wrought-iron saddle boiler, somewhat like the Gold Medal, but having only two chambers in the interior, instead of three. It has a waterway both at back and front, and is fed from the top instead of the furnace door. This latter arrangement has now been introduced into other forms of saddle boilers, it being considered advantageous in saving labour in stoking. There are various other modifications of the saddle in use, where more chambers are made in the crown part or on the sides. Those already noticed will be found thoroughly efficient, and, not being complicated in construction, are much to be preferred.

A powerful boiler for Heating great lengths of piping, on account of its form being specially adapted for sustaining heavy pressure, is the Improved Cornish or

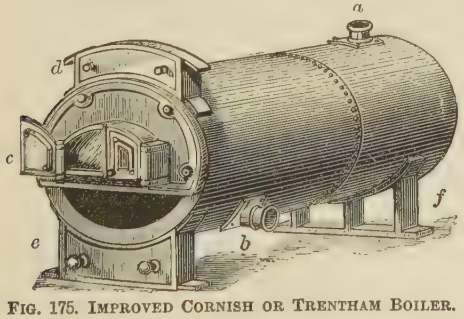


FIG. 175. IMPROVED CORNISH OR TRENTHAM BOILER.

a, Flow Pipe; *b*, Return Pipe; *c*, Furnace Door; *d*, Upper Flue Door; *e*, Lower Flue Door and Front Stand; *f*, Back Stand.

Trentham Boiler, represented in Fig. 175. It consists of two wrought-iron cylinders, strongly riveted together, about 2in. of water space being allowed between them. The door frame is attached to one end, and the fire bars are inside the cylinder near the bottom, which forms an ash-pit, the upper, or larger, portion being the furnace. In fixing, the boiler is stood on two cast-iron stands, the front one forming a frame for the lower flue doors. Walls are built clear of the boiler on either side, and upper and lower flues formed by a course of fire bricks being fixed against the side of the cylinder about half-way up; an arch spanning the top from this. The heat is conducted through the centre, over the top by the upper flue, and then returns by the bottom one to

Heating—*continued.*

the chimney, thus exposing the fullest possible amount of water space to the action of the fire. The minimum approximate Heating power of this boiler, 5½ft. long by 3ft. diameter, is given as 2000ft. of 4in. piping; and one 8ft. long by 3½ft. diameter is calculated to heat 5500ft. of the same sized pipes.

Tubular boilers are composed of a series of cast-iron tubes placed either in an upright or a horizontal direction, and connected together for the free circulation of water in all parts. Some are cast in one piece—an objectionable system, as any defect in casting, or an accident, may cause a leakage at any time, which, if serious, would render the whole useless. To meet this objection, and effect further improvements, Messrs. Weeks and Co., of Chelsea, have provided, in their notable and widely-used Duplex Upright tubular boilers with diaphragm, a system by which the whole may be worked together, or, in the event of an accident to one part, that half of the boiler may be removed and the other still kept working until repairs are finished. Duplicate parts are kept for replacing those which become defective, without the necessity of substituting a new boiler. Water tubes inclose the furnace, and small horizontal ones are placed as fire bars. The fuel is admitted at a circular hole in the top, which is provided with an iron cover. Rivers' Patent is a rather expensive, but a powerful, tubular boiler, which may be practically termed indestructible. It has a double row of horizontal tubes, forming a semicircle above the fire, which is fed from the furnace door. On any one of the tubes becoming defective, it can be replaced by a duplicate in a very short time, and the Heating conducted as before. These boilers are in use, in some instances, where enormous lengths of pipes are connected; but it should be stated that they have not been sufficiently tried to prove whether they would be equally satisfactory in all cases. They are noted for rapid circulation.

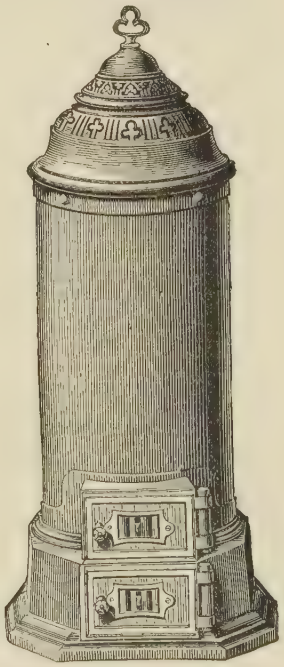


FIG. 176. UPRIGHT CYLINDER BOILER. FRONT ELEVATION.

For Heating a small or moderate-sized house, such as those frequently possessed by amateurs, a portable Upright Cylinder Boiler and Furnace, similar to that shown in Figs. 176 and 177, is well suited. It may be placed near

Heating—*continued.*

one end, or even inside a house, as no bricks are required for setting, and the smoke may be conducted from the flue to the outside by a circular pipe or chimney. The exterior view of these independent boilers presents a neat appearance; but it is not advisable to place them inside the

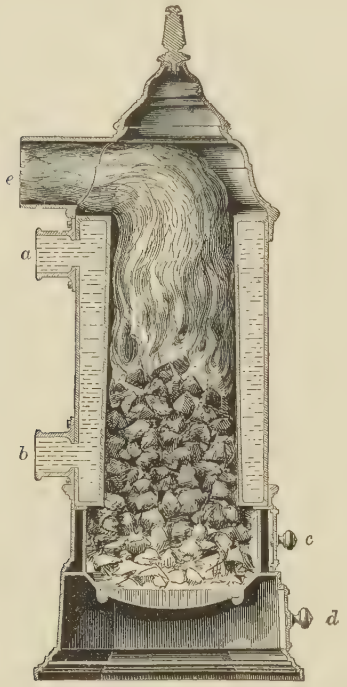


FIG. 177. UPRIGHT CYLINDER BOILER. VERTICAL SECTION.

a, Flow Pipe; *b*, Return Pipe; *c*, Fire Door; *d*, Ash-box Door, with Ventilator; *e*, Smoke Flue.

plant house if it can be avoided, on account of their drying effect on the air. Independent cylinder boilers are made both with and without an extended top for adding fresh fuel.

Small greenhouses are occasionally heated with boilers warmed by gas instead of ordinary fuel. This method is rather expensive to keep sufficient water in circulation for raising or maintaining a medium temperature in a large glass house. It is, however, a convenient mode of excluding frost from small structures in places where a

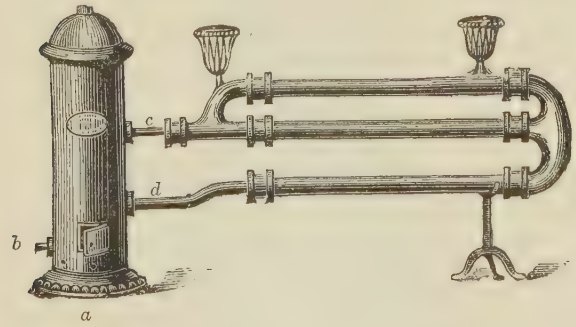


FIG. 178. WRIGHT AND CO.'S GAS BOILER.

a, Boiler, consisting of Heating Coil, inclosed in a case; *b*, Connection of Burners with Gas-pipe; *c*, Flow Pipe; *d*, Return Pipe.

plentiful supply of gas can be obtained. It has an advantage for those who do not require much heat, and

Heating—*continued.*

who are unable to attend to fires. When once started at the proper rate, the water will continue to warm and circulate so long as the gas keeps burning. A little additional water is necessary in the supply cistern occasionally. Gas boilers, of which Messrs. Wright and Co.'s is a good arrangement (see Fig. 178), consist of a heating coil of pipes arranged above one or more Bunsen burners inside an inclosed case, and having a flow pipe attached, which branches into another, as shown in the illustration, and returns to the lower part of the boiler. With a small flue attached, the whole apparatus can stand in the house it has to warm, and thus the full amount of heat will be utilised. The product of combustion from a Bunsen burner is merely a slight vapour, sufficient oxygen being incorporated with the gas, so soon as it leaves the pipe, to cause its whole consumption by the fire without any soot being left. Two stoves heated by gas, and answering

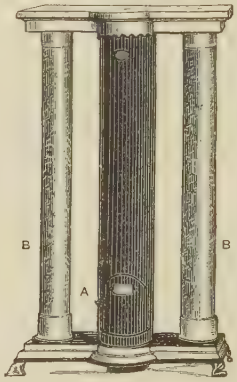


FIG. 179. RITCHIE'S LUX CALOR.

A, Door, which opens on a Bunsen burner; B, B, Tubes, in which the products of combustion are condensed (with the exception of the carbonic acid) into fluid form.

without flues, are Ritchie's Lux Calor (see Fig. 179) and Clark's Syphon Condensing Stove, represented in Fig. 180; both having Bunsen burners attached. In the Lux Calor, the products of combustion, with the exception of carbonic acid, are condensed in tubes on either side of the burner.

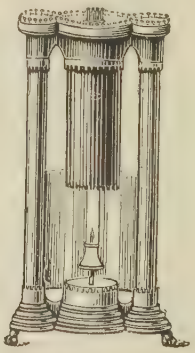


FIG. 180. CLARK'S SYPHON CONDENSING STOVE.

There is little fear of the small amount of carbonic acid gas doing injury, as, being heavier than atmospheric air, it falls to the lowest point, and is removed by any feeble current. This stove is calculated to warm any fairly good structure, not too much exposed, with an interior capacity not exceeding 1000 cubic feet. The Syphon Condensing Stove is constructed on somewhat the same lines as the Lux Calor; but, unlike it, the warm air is—after parting with the products of combustion—conveyed through a tube over the flame and into the space to be

Heating—*continued.*

warmed; an additional amount of purity in the air being claimed by the inventor in consequence of this process. The Syphon Condensing Stove is considered useful and available for small lean-to or other houses, containing a cubic capacity of from 600ft. to 800ft., in places inaccessible to a hot-water apparatus.

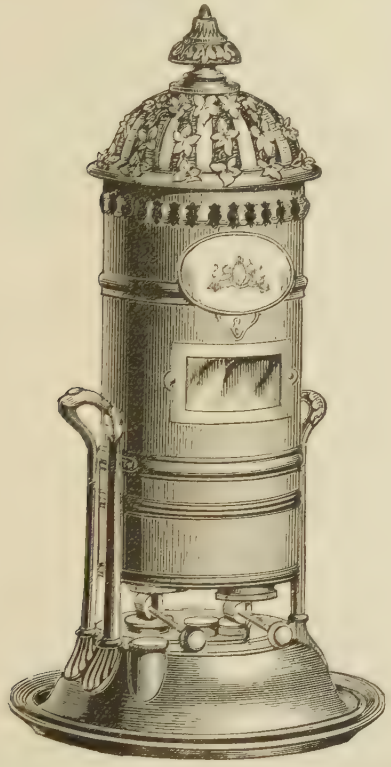


FIG. 181. MINERAL OIL STOVE, WITH DOUBLE BURNERS.

Mineral oil stoves (see Fig. 181) are perforce used by amateurs for excluding frost from small houses in winter. They are objectionable on account of the strong smell caused by the oil when burning, but are useful where no other means of Heating can be procured, or as a substitute at times when a permanent apparatus gets out of order. Large oil stoves with double burners emit a considerable amount of heat, and materially raise the temperature in a small house.

All boilers should be provided with a tap near the bottom, for emptying, in case of repairs, or for removing sediment that collects inside. Air taps must be fixed in the highest points of the flow pipes, or, better still, a small lead tube may be connected and carried up the inside of the house, higher than the level of any part of the apparatus. Hot-water pipes are usually made of cast iron, and the joints may be connected with various compositions, such as cement, red and white lead mixed, steel filings, &c. Each substance is largely used by different Heating engineers, the last-named being perhaps the oldest, and—when mixed with the proper proportion of sal-ammoniac, and a little sulphur, to cause rusting — the most substantial method; it is, however, more difficult to disconnect joints made with this preparation than when red lead is employed. Strong hemp packing, in addition, will be requisite in either case. Some persons prefer joints made with flanges, and screwed together, with vulcanised indiarubber washers between. These occupy more space

Heating—*continued.*

than ordinary sockets, but have the advantage of being easily replaced. Indiarubber rings also make good joints, and are quickly renewed or removed in cases of necessity. They are made of the proper size, and placed on the smaller end of one pipe, which is then pushed into the socket end of the other. All pipes in use should rest on firm walls or stands prepared for them; sufficient room for expansion being allowed on each side, and at the ends. To insure a free circulation, the interior must be kept free from air, and all valves should be capable of opening a waterway as nearly as possible the full size of the pipe. A water cistern must be provided, and fixed at a higher level than any part of the apparatus it has to keep supplied.

HEBECLADUS (from *hebe*, pubescence, and *klados*, a branch; in reference to the hairiness of the young shoots). ORD. *Solanaceæ*. A genus containing about five species of stove perennial herbs or sub-shrubs, natives of Western tropical America. They thrive in a rich sandy loam and leaf mould. Propagated by cuttings, made from half-ripened wood, and inserted in sand, under a bell glass, in bottom heat.

H. biflorus (two-flowered). *fl.*, peduncles axillary, solitary, forked or trifid, bearing two (rarely three) handsome drooping flowers; calyx glabrous, with five spreading segments; corolla of two colours, 1in. or more long; tube conico-cylindrical, purple, hairy, striated; limb of five spreading, green, narrow-lanceolate segments; stamens much exserted; anthers blue-purple. August. *l.*, lower ones solitary, alternate; upper ones in unequal pairs, sub-ovate, shortly petiolate, acute. Branches more or less spreading, terete, glabrous. Andes of Peru, 1844. Sub-shrub. (B. M. 4192.)

H. ventricosus (ventricose). *fl.* one or two together, on short drooping peduncles from the axils of the leaves; calyx finely pubescent, toothed; corolla pale yellow, ½in. broad and deep; limb toothed. Summer. *fr.* a large, glabrous, poisonous berry. *l.* shortly stalked, ovate, acute, entire, or slightly sinuate-dentate; upper surface bright medium green; the lower paler. *h.* 3ft. to 4ft. Peru. Shrub. (Ref. B. 208.)

HEBECLINIUM. *See* **Eupatorium.**

HEBENSTRETIA (named in honour of John Ernest Hebenstreit, 1703-1757, Professor of Botany in the University of Leipsic). ORD. *Selagineæ*. A genus containing about twenty species of greenhouse evergreen shrubs, sub-shrubs, or annual herbs, natives of South Africa (one extending to Abyssinia), few of which are seen in cultivation. Flowers white or yellow, sessile; spikes terminal, often dense, short or elongated. Leaves alternate or scattered. The species thrive in a compost of sandy fibry loam, with the addition of a little peat. Propagated by cuttings, made of short young shoots, and inserted in sandy peat, under a bell glass, in spring. *H. dentata* is increased by seed.

H. dentata (toothed). *fl.* white; spikes smooth. May to September. *l.* linear, toothed. *h.* 1ft. 1739. Annual. (B. M. 433.)

H. fruticosa (shrubby). *fl.* white, in oblong spikes, disagreeably scented at night; calyx small, bipartite; corolla tube longer than calyx, filiform; bracts entire, ovate, acuminate, sometimes ciliate. August. *l.* linear-lanceolate, dentate or rather pinnatifid-dentate, smooth when full grown; young ones somewhat hairy along the midrib on the under side. Stems shrubby. *h.* 1½ft. 1816. (B. M. 1970.)

H. integrifolia (entire-leaved). *fl.* white. May and June. *l.* linear, quite entire. *h.* 1ft. 1792. (A. B. R. 252.)

HECHTIA (named after J. H. G. Hecht, a Prussian Counsellor, who died in 1837). ORD. *Bromeliaceæ*. A genus containing about six species of pretty greenhouse herbs. Flowers small, disposed in a compound spike. Leaves long, spiny, crowded, recurved, subulate, linear. For culture, *see* **Tillandsia.**

H. argentea (silvery).* *fl.* white, small, in globose clusters. *l.* in a dense rosette, sharply recurved, rigid, 1½ft. to 2ft. long. General habit of *H. Ghiesbreghtii*, but very distinct by reason of the dense silvery coating of both leaf surfaces. Mexico.

H. cordylinoides (Cordyline-like). *fl.* numerous, small, in a much-branched panicle. *l.* lanceolate, recurved, remotely and strongly saw-toothed. Mexico, 1881. Habit tufted. (B. M. 6554.)

Hechtia—*continued.*

H. Ghiesbreghtii (Ghiesbreght's). *fl.* whitish, insignificant, small, clustered on tall slender scapes. *l.* rosulate, recurved, spiny, very ornamental, purple and green, silvery below. Mexico, 1863. (B. M. 5842.)

HEDAROMA. *See* **Darwinia.**

HEDERA (the old Latin name for the Ivy, used by Virgil and Pliny). Ivy. ORD. *Araliaceæ*. A genus, as now limited, containing but a couple of species of tall climbing shrubs, of which the one—in one or other of its numberless forms—is widely distributed throughout the Northern hemisphere, and the second confined to Australia. Flowers polygamous; umbels paniculate. Leaves undivided, lobed or pinnate, compound. Few plants are more serviceable in both large and small gardens than the old-fashioned Ivy, scarcely any situation being unsuitable for it. In a good rich soil, growth is much more rapid than in a poor one; and strong plants, grown first in pots before placing out, well repay for the extra preparation thus made, by covering their allotted space in a much shorter time. Ivy is now extensively used to cover open railings, as an arbour, as an edging plant, as a "screen" for a drawing-room, for hanging baskets, and in several other ways. When established, it is advisable to clip off all the old leaves annually, about April, as a close growth is thereby induced, and the old foliage is soon replaced by new. Propagation is readily effected by cuttings of any moderately firm young shoots, inserted in pots, or in the open ground, preferably in autumn. The tree forms and their numerous sports are grafted, any common strong-growing climbing form being used as a stock. The others may also be grafted, and the rarer variegated ones usually are, as this method of increase is a much more rapid one than cuttings. If cuttings are inserted in heat, and kept shaded until roots are formed, good plants are obtained in much less time than when placed in a cold frame, or in the open air.

H. australiana (Australian). *fl.*, umbels pedunculate, with the peduncles almost verticillate along the elongated branches of a large, loose, terminal panicle. *l.* large, pinnate, the rachis articulate; leaflets few, ovate, oval-oblong or ovate-lanceolate, shortly acuminate, often above 6in. long, smooth and shining, but prominently veined. Queensland. A small, quite glabrous, greenhouse tree.

H. canescens (hoary). A synonym of *H. Helix algeriensis.*

H. Cavendishii (Cavendish's). A synonym of *H. Helix marginata minor.*

H. cordata (heart-shaped). A synonym of *H. Helix scutifolia.*

H. elegantissima (most elegant). A synonym of *H. Helix marginata rubra.*

H. grandifolia (large-leaved). A synonym of *H. Helix canariensis.*

H. Helix. Common Ivy. *fl.* yellowish-green; borders of the calyx entire; petals five, broad and short; stamens five. Autumn. *l.* thick and shining, ovate, angular, or three or five-lobed; those of the barren stems usually much more divided than the upper ones. Western and Southern Europe, Northern Africa, and West Central Asia; extending over the whole of Britain. Of the innumerable forms, the following are the best:

FIG. 182. HEDERA HELIX ALGERIENSIS VARIEGATA.

H. H. algeriensis (Algerian).* *l.* yellowish-green, varying from entire broad-ovate or orbicular to a peculiar rounded three-lobed form. A fine rapid-growing variety, with large leaves of a cheerful green. SYN. *H. viridis* (S. H. Ivy, 99). There is a variegated form of this, which, although not particularly attractive in a young state, is handsome when thoroughly established. SYN. *H. canescens.* See Fig. 182.

Hedera—*continued.*

FIG. 183. HEDERA HELIX ARBORESCENS AUREA MACULATA.

H. H. arborescens (arborescent). This is the "tree" form of the common native Ivy of our woods and hedge banks. There are sub-varieties, with golden (see Fig. 183) and silver variegation, and one with yellow berries.

H. H. aurantia (orange).* *l.* like those of *H. H. chrysocarpa*, but fruits of a beautiful reddish-orange colour. (R. H. 1884, 84.)

FIG. 184. HEDERA HELIX CONGLOMERATA.

H. H. canariensis (Canary Islands). Irish Ivy. This is the common large-leaved climbing Ivy—the best of all for quickly clothing walls, or for forming a green carpet under trees or on banks where grass, &c., refuses to grow. *l.* deep green, usually five-lobed; terminal lobe largest. The fertile state of this, *i.e.*, that which has outgrown the climbing stage, and produces flowers and fruit, has entire ovate leaves, and is propagated by grafting on the type; it is generally known in nurseries under the name of *H. H. arborescens.* SYN. *H. grandifolia.* There is a variegated form of this, but it is very apt to revert to the type.

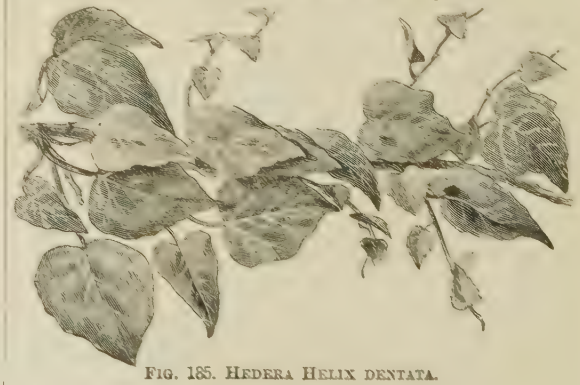


FIG. 185. HEDERA HELIX DENTATA.

Hedera—*continued.*

H. H. chrysocarpa (golden-fruited).* *l.* smallish, sometimes nearly triangular and three-lobed; central lobe frequently prolonged, with a few sharp lobes or notches; colour greyish-green; principal veins lined with markings of a lighter shade. A quick-growing climber.

H. H. conglomerata (crowded).* A marked, slow-growing, erect variety, with small, wavy leaves, and very short internodes. An excellent subject for rockwork. See Fig. 184.

H. H. cuspidata minor (smaller cuspidate). *l.* uniformly three-lobed, the lobes equal and crenated; colour a deep rich glossy green, with whitish veins. A pretty small-leaved variety, with bright reddish-purple leaf-stalks, and stems purplish when young.

H. H. deltoidea (deltoid). *l.* bluntly deltoid, blackish-green, changing in autumn to a dull purplish-bronze. Stem purplish, rather stout. A distinct wall Ivy. (S. H. Ivy, 75.)

H. H. dentata (toothed). A large handsome Ivy, somewhat like *H. H. Rægneriana*, but with less glossy leaves, which are not unfrequently distinctly toothed. See Fig. 185.

FIG. 186. HEDERA HELIX DIGITATA.

H. H. digitata (digitate). *l.* more decidedly digitate than in most other Ivies, blackish-green, with whitish veins. A rather vigorous grower, and an excellent Ivy for walls. See Fig. 186. *H. H. Caenwoodiana* is a plant which scarcely differs (if at all) from *H. H. digitata.*

FIG. 187. HEDERA HELIX DONERAILENSIS.

H. H. Donerailensis (Donerail's).* A very pretty, small-leaved form, with leaves which assume a dull purple-brown colour in winter. A neat, compact plant, of medium rate of growth, good for walls, or for pot culture. See Fig. 187.

FIG. 188. HEDERA HELIX LOBATA MAJOR.

Hedera—*continued.*

H. H. Glymii (Glym's). *l.* varying in form from regular ovate to long wedge-shaped, many of them being obscurely three-lobed; colour a very glossy, deep dull green. A fine and distinct form, of a wiry habit of growth. One of the best for pot culture.

H. H. gracilis (slender). *l.* usually three-lobed; colour rather light dull green, richly bronzed in autumn. Stems wiry, purplish. A very pretty variety for covering a wall or a tree stump. (S. H. Ivy, 66.)

H. H. lobata major (larger-lobed). *l.* three to five-lobed (in old plants, large), deep glossy green. A good, vigorous grower. See Fig. 188.

FIG. 189. HEDERA HELIX LUCIDA.

H. H. lucida (glossy). *l.* frequently deltoid, glossy; larger ones, in vigorous plants, with from three to five somewhat indistinct lobes. A fast grower, suitable for clothing walls and tree stumps, or for pot culture. See Fig. 189.

H. H. luteola (yellowish-tinted). *l.* from broadly ovate to irregular rhomboid, occasionally three-lobed; stems and petioles usually green, sometimes slightly purplish; central parts dark green, mottled with grey; margin broad, of a yellowish cream colour. A fine tree Ivy, of robust habit, and an excellent form for pot culture.

H. H. marginata (margined). *l.* bluntly triangular; ground colour dull green, margined with creamy-white, brilliantly striped with red or pink in autumn. A somewhat slow-growing form. (S. H. Ivy, 78, 88.)

H. H. marginata aurea (golden-margined). *l.* elongate triangular, bordered with faint orange-yellow, turning to red. An excellent Ivy for walls.

H. H. marginata minor (lesser margined). A pretty but slow-growing form, with smaller leaves than *H. H. marginata*. Not vigorous enough for walls, but a desirable plant for cultivation in pots. SYN. *H. Cavendishii.*

H. H. marginata rubra (red-margined). This differs from *H. H. marginata* in the bright deep rosy-red hue of the extreme edge of the leaf; the red colour does not appear until autumn, and disappears in spring. A slow-growing variety. SYNS. *H. elegantissima*, *H. tricolor.*

FIG. 190. HEDERA HELIX MARMORATA MINOR.

H. H. marmorata (marbled). A large-leaved form, of vigorous habit, with irregular blotches of a creamy-white colour. Good for walls or rough rockwork. Another and very distinct sub-variety is *marmorata minor*, with much smaller leaves. The variegation of this, too, is less apt to "run out" than that of the larger form. See Fig. 190.

H. H. palmata (palmate). *l.* medium-sized, three to five-lobed; colour a dull deep green. This, in a young state, much resembles *H. digitata*, but, when mature, is distinct enough to deserve a varietal name. A neat, but rather slow grower. (S. H. Ivy, 75.)

H. H. pellucida (translucent). *l.* medium size, bluntly quadrangular, mottled with green and white, or white and semi-transparent. Young stems red. Habit robust.

H. H. purpurea (purple). A climbing Ivy with leathery leaves like those of *H. Rægneriana*, but of a purplish colour.

H. H. Rægneriana (Rægner's).* *l.* large, dark green, leathery, broadly cordate. A handsome and distinct variety, of vigorous habit. The arborescent form of this is the most striking of all the tree Ivies. See Fig. 191.

Hedera—*continued.*

FIG. 191. HEDERA HELIX RÆGNERIANA.

H. H. rhombea (rhomboid).* *l.* rhomboid, green, narrowly margined with creamy-white. A distinct form of medium, or, rather, small size, and of somewhat slow growth.

H. H. sagittæfolia (arrow-leaved). *l.* usually bluntly three-lobed, the central lobe projecting forward in the form of a letter V; colour a dull dark green, with a few patches of blackish-bronze, which change, in autumn, to a rich purplish-bronze; principal veins light green. A free grower, of wiry habit. (S. H. Ivy, 69.)

H. H. scutifolia (shield-shaped-leaved). *l.* medium size, roundish triangular, or obscurely three-lobed, dull green; veins obscurely marked. A distinct variety, but not a robust grower. SYN. *H. cordata.* (S. H. Ivy, 74.)

FIG. 192. HEDERA HELIX VARIEGATA.

H. H. variegata (variegated). This, one of the numerous variegated forms of our native Ivy, has lighter green leaves, margined and blotched with creamy-white. It keeps very constant, and, although not so quick a grower or so handsome as some others, is well worth a place against a wall or an old tree trunk. See Fig. 192.

H. H. Willseana (Wills's). This is a dark-leaved form, nearly allied to *H. H. lobata major*, from which it differs in the veins being less distinctly marked, and in the colour being much darker in the summer, and in winter deepening to almost black. SYN. *H. nigra.* (S. H. Ivy, 62 and 72.)

H. nigra (black). A synonym of *H. Helix Willseana.*

H. tricolor (three-coloured). A synonym of *H. Helix marginata rubra.*

H. viridis (green). A synonym of *H. Helix algeriensis.*

HEDERACEÆ. A name given to the order *Araliaceæ.*

HEDGEHOG THISTLE. *See* **Echinocactus.**

HEDGE HYSSOP. *See* **Gratiola.**

HEDGE MUSTARD. *See* **Erysimum.**

HEDGES. Hedges of various descriptions are extensively planted in connection with gardens. They may either form the boundary fence, or be intended for screens, shelter, &c. Various shrubs and plants are available for utilising, according as any one may succeed better than another, or to suit the special requirement for which the Hedge is intended. Different soils and localities must also be taken into consideration. Box, Privet, Thuja, &c., succeed almost anywhere as Hedges, the last-named doing best on rather heavy soil; but neither is suited for anything beyond a screen where there is a paling as well, or for dividing one part of a garden from another. As a boundary fence, Whitethorn and Beech, planted together when young, and afterwards kept frequently cut in, form, eventually, a Hedge which is practically impassable. Blackthorn may also be similarly used, but it has the disadvantage of throwing up quantities of suckers from creeping roots. The Myrobalan, or Cherry Plum (*Prunus cerasifera*) is sometimes used, and forms, when established, an excellent Hedge. It is, moreover, very attractive when in flower. Hornbeam grows quickly, and makes a capital deciduous Hedge, either for a boundary or for shelter. Common Laurel may also be planted for the purpose, but it is liable to injury from severe frosts. Yew and common Holly make the thickest and best Hedges for shelter. The former is rather slow-growing, and both succeed best on a rich, rather heavy soil. Hollies transplant readily in April or September, when of a good height; consequently, a full-sized, thick Hedge may be at once secured in necessary cases. When inserting young plants, autumn or early spring should be selected for the operation; the ground should be previously well prepared by trenching, and by the addition of a little manure, if it is poor. In the case of a Hedge which is eventually to be a boundary division for keeping cattle, &c., out of a garden inclosure, a wooden fence will be requisite for some time as well. This may be made of rough posts, with long bars fitted in them. Thorns should be cut nearly to the ground the first year, and stopped enough afterwards to keep them thick at the bottom. They should be trimmed once or twice each summer after becoming established. Holly and Yew Hedges are usually clipped, with shears, in September, when growth is completed. Broad-leaved shrubs, such as Laurels, should be cut in with a knife, in preference to shears, which sever the leaves, rendering them unsightly, and the Hedge exceedingly formal. Young Hedges are much improved, and their growth encouraged, when the soil is kept open round their roots with a hoe or fork, which also destroys weeds at the same time.

Hedges—*continued.*

HEDWIGIA (named after John Hedwig, 1730-1799, a celebrated muscologist and Professor of Botany, at Leipsic). SYNS. *Caproxylon, Tetragastris.* ORD. *Burseraceæ.* A genus containing four or five species of glabrous trees, natives of the West Indies, Northern Brazil, and Guiana. *H. balsamifera*, the species best known to cultivation, is a tall-growing stove evergreen tree, yielding an exudation of a balsamic nature. It requires a sandy loam soil, with a little peat added. Propagated by ripened cuttings, inserted in sandy soil, in a rather strong heat.

H. balsamifera (balsam-bearing). *fl.* whitish, small, in panicled racemes. *l.* impari-pinnate, with stalked, quite entire, coriaceous leaflets. *h.* 60ft. West Indies, 1820.

HEDYCHIUM (from *hedys*, sweet, and *chion*, snow; referring to the sweet-scented snow-white flowers of *H. coronarium*, which was the first species introduced). Indian Garland Flower. ORD. *Scitamineæ.* A genus of about twenty-five species of handsome stove herbaceous plants, all natives of tropical Asia. They have terminal spikes of white, scarlet, or yellow flowers, and fine foliage. Some of the species, particularly *H. Gardnerianum*, thrive well planted out in a wide conservatory border, in a compost of good loam enriched with a little thoroughly decayed manure, and the whole rendered porous by the addition of some sharp sand. Hedychiums are exceedingly ornamental.

Hedychium—*continued.*

Occasional supplies of liquid manure are beneficial in securing strength and vigour. These plants are also valuable for sub-tropical gardening, and for this purpose may be treated similar to **Canna** (which *see*). For pot culture, they may be placed in large pots or tubs, in spring, using rich soil, and applying plenty of water and liquid manure when established. When flowering is over, the spikes may be cut down. In spring, when the plants are repotted, the rhizomes can be divided. The second season, the spent earth can be partly removed, and the plants repotted into pots or boxes only an inch or two larger. Where a heated tank is used for growing tropical water plants, place the bottom of the pots or tubs, containing the Hedychiums, in the water to a depth of 2in. or 3in.; where such a convenience does not exist, water the plants two or three times daily during the season of growth. Of those now in cultivation, *H. Gardnerianum* is by far the commonest; and, with the exception of that species, and of *H. flavum*, the ones mentioned below are stove plants.

H. acuminatum (taper-pointed). *fl.* handsome, fragrant; spike loose, 9in. or more long; two outer segments of corolla limb linear, patent; of the three inner, two are pale yellow, the third pure white; lamina deeply cut into two segments; filaments red. October. *l.* broadly lanceolate, with an almost filiform point, glabrous above, slightly silky beneath. *h.* 3ft. to 5ft. East Indies, 1820. (B. M. 2969.)

H. angustifolium (narrow-leaved).* *fl.* dull red, small, generally four to a fascicle, expanding in succession; corolla tube slender, cylindric, about 1in. long; calyx same length, superior, cylindric; spikes terminal, erect, rigid, open, 6in. to 18in. long, smooth. June. *l.* linear-lanceolate, 10in. to 14in. long, 1in. to 2in. broad, bifarious, sessile on their smooth sheaths, pointed, smooth on both sides. Stems erect, 3ft. to 6ft. high. India, 1815. (B. M. 2078.)

H. carneum (flesh-coloured). *fl.* flesh-coloured, scentless; bracts ciliated, one-flowered, convolute; calyx sub-tomentose. August. *l.* bifarious, over 1ft. long, very slender, acuminate. *h.* 3ft. to 4ft. East Indies, 1823. (B. M. 2637.)

H. chrysoleucum (gold and white). *fl.* pure white, with a bright orange-coloured blotch on the lip, very fragrant; filaments long, very deep orange. August. *h.* 5ft. East Indies. (B. M. 4516.)

H. coronarium (garland).* *fl.* snow-white, sweet-scented; lip nearly 2in. wide. May. *h.* 5ft. East Indies, 1791. (B. M. 708.)

H. flavosum (yellow).* *fl.* yellow, numerous, fragrant; corolla tube slender; laciniæ linear; lip erect, large, obcordate; spike terminal, solitary, erect, 6in. to 8in. long. July. *l.* lanceolate, very fine-pointed, pubescent and pale beneath; sheaths slightly pubescent. *h.* 2ft. to 3ft. Silhet, Bengal. (B. M. 2378, under name of *H. flavum.*)

H. flavum (yellow).* *fl.* bright orange, large, fragrant. July. *l.* 12in. to 14in. long. *h.* 3ft. Nepaul, 1822. In many Cornish gardens, this handsome species has proved nearly hardy. (B. M. 2039.)

FIG. 193. HEDYCHIUM GARDNERIANUM, showing Habit and detached Flower-spike.

H. Gardnerianum (Gardner's).* *fl.* lemon-coloured, large, fragrant. Summer. *l.* broadly lanceolate, stem-clasping, in two rows. *h.* 3ft. to 5ft. East Indies, 1819. This very fine species is nearly hardy in England, if provided with a slight winter protection. The crowns, may, however, be lifted and stored similar to those of the Dahlia or Canna. See Fig. 193. (B. R. 774.).

H. gracile (slender). *fl.* white, with the filament red; calyx tubular, membranous; corolla tube ⅝in. to ¾in. long; lobes three, filiform; staminodes linear, acute; lip linear-oblong, two-lobed; spike 5in. to 7in. long. September. *l.* 5in. to 9in. long, 2in. to 3in. broad, finely acuminate; base acute, narrowed into a petiole ½in. to ¾in. broad. *h.* 2ft. to 3ft. Sikkim-Himalaya and Khasia Mountains, 1820. (B. M. 6638.)

H. spicatum (spike-flowered). *fl.* yellowish; corolla-tube extending 1in. beyond the sheath; lip two-lobed, emarginate. October. *l.*, spathe erect, one-flowered, two-valved. *h.* 3ft. India, 1810. (B. M. 2300.)

HEDYOTIS CAMPANULIFLORA. *See* **Coccocypselum campanuliflorum.**

HEDYSARUM (*Hedysaron*, the Greek name used by Dioscorides). ORD. *Leguminosæ*. This genus includes about fifty species of elegant hardy perennial herbs or sub-shrubs, which are distributed throughout Europe, North Africa, and the temperate and mountainous parts of Asia, two species being North American. Flowers purple, white, yellowish-white, or rarely yellow; peduncles bearing racemose spikes of large flowers. Leaves imparipinnate; leaflets entire, often pellucid-dotted, exstipellate. Very few species are grown in our gardens, with the single exception of *H. coronarium*. They are all of very easy culture in ordinary gardens, but open, sunny spots, and good deep soil, are most calculated to insure success. Increased by seeds.

H. coronarium (garland).* French Honeysuckle. *fl.* deep red; spikes or racemes ovate, crowded. Summer. *l.* with three to five pairs of elliptic or roundish leaflets, which are clothed with pubescence beneath and on the margins. Stems diffuse. *h.* 3ft. to 4ft. South-west Europe, 1596. Perennial herb. There is also a white-flowered variety. *H. flexuosum*, a closely allied species, from Southern Spain, has red flowers, tinged with blue.

H. Mackenzii (Mackenzie's). *fl.* red, large, disposed in long racemes. Summer. *l.*, leaflets oblong, clothed on both surfaces with hoary pubescence. North America, 1878. Plant decumbent. Perennial herb. (B. M. 6386.)

H. obscurum (obscure). *fl.* purple, in long spikes. Summer. *l.* with five to nine pairs of ovate-glabrous leaflets. Stems erect. *h.* 6in. Europe, 1640. Perennial herb. (B. M. 282.)

H. sibiricum (Siberian). *fl.* purple; racemes long, axillary; bracts shorter than the peduncles. June and July. *l.* pinnate, ovate-lanceolate, smooth. *h.* 4ft. Siberia, 1798. Perennial herb. (B. M. 2213; B. R. 808, under name of *H. alpinum.*)

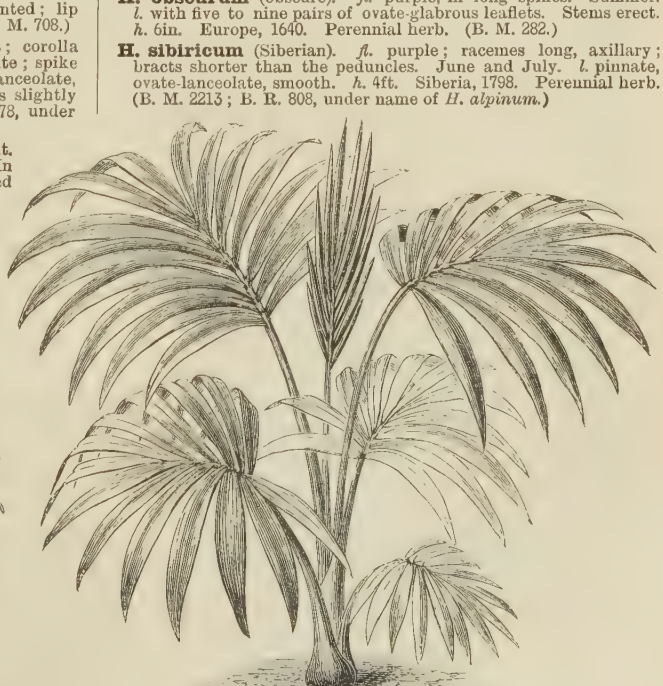


FIG. 194. HEDYSCEPE CANTERBURYANA.

HEDYSCEPE (from *hedys*, sweet, and *skepe*, a covering). ORD. *Palmæ*. A monotypic genus, the species being a tall stove palm. For culture, *see* **Kentia.**

H. Canterburyana (Viscount Canterbury's).* *fl.*, panicle branching into spreading spikes of about 6in., the rachis thick and flexuose, the notches not immersed and not close; male perianth, outer segments narrow-lanceolate, about two lines, the inner ones broader and striate; female perianth, outer segments three lines broad, and almost as long, inner ones ovate and rather shorter. *fr.* ellipsoid, the pericarp hard when dry. *l.* long, pinnate, in a dense head; segments numerous, nearly equal, and acuminate. *h.* 32ft. Lord Howe's Island. SYN. *Kentia Canterburyana*. See Fig. 194.

HEEL. The base of a young cutting, when removed from the junction formed by its connection with the parent plant. Many cuttings, especially those of a hard-wooded nature, root better when inserted with Heels, that part of the wood being just sufficiently solidified; and, if removed from the side of a branch, a larger surface is secured for placing in contact with soil than when a horizontal cut is made.

HEELING-IN. The temporary insertion of cuttings, or the roots of plants, in soil, to preserve them until their permanent quarters are prepared. Heeling-in also applies to crops that are lifted, and their roots temporarily covered with soil in a cool situation, to prolong the season of supply.

HEERIA (named in honour of Oswald Heer, a celebrated Swiss botanist of the present century). SYNS. *Heterocentron*, *Schizocentron*. ORD. *Melastomaceæ*. A genus comprising about four species of erect or prostrate, pilose or glabrous herbs and sub-shrubs, inhabiting the mountains of Mexico and Guatemala. Flowers white or pink; petals four, ovate or obovate, obtuse or acuminate. Leaves cordate, lanceolate, or obovate-lanceolate, membranaceous. *H. rosea*, the only species yet introduced, is a very rare but ornamental stove evergreen shrub, which can be grown out of doors, in warm localities, during part of the summer. It is a valuable stove winter-flowering plant, and succeeds best in sandy loam and peat. Cuttings of young shoots may be struck in February and March.

H. rosea (rosy). *fl.*, panicle compound, terminal, spreading, composed of the numerous flowering branches, each of which forms a corymb of many bright rose-coloured flowers, nearly 1in. in diameter; petals four, spreading, rhomboid-orbicular, a little concave, shortly unguiculate. Autumn and early winter. *l.* opposite, slightly scabrous above, elliptical, obtuse, entire, penni-nerved, tapering at the base into a moderately long petiole. *h.* 1ft. or more. Mexico. Plant suffruticose. (B. M. 5166, under name of *Heterocentrum mexicanum*.)

HEIMIA. This genus is now included under **Nesæa** (which *see*).

HEINSIA (named after the celebrated philologist, Heinsius, who translated the writings of Theophrastus). ORD. *Rubiaceæ*. A genus including three or four species of evergreen shrubs, natives of tropical Africa. Flowers white, largish, pedicellate, solitary, or disposed in three to six-flowered terminal cymes. Leaves opposite, shortly petiolate, oblong or elliptic-lanceolate, acuminate. *H. jasminiflora*, the only species yet introduced, is a beautiful, much-branched, unarmed, glabrous, stove shrub. For culture, *see* **Gardenia.**

H. jasminiflora (Jasmine-flowered).* *fl.* white, salver-shaped, numerous, three or four together at the tops of the branchlets, pedicellate, somewhat racemose. February. *l.* opposite, oval-oblong or ovate, acuminated, on short petioles. *h.* 5ft. to 8ft. Sierra Leone, 1824. (B. M. 4207.)

HEINTZIA. This genus is now included under *Alloplectus*.

HEISTERIA (named after Laurence Heister, 1683-1758, Professor of Botany at Helmstadt). Partridge Pea; Pois-Perdrix. SYN. *Hesioda*. ORD. *Olacineæ*. This genus comprises about ten species of glabrous trees or shrubs, one from Western tropical Africa and the rest from tropical America. Flowers small, sessile or pedicellate, in the axils of the leaves. Leaves entire, coriaceous. Probably the only species yet introduced is the one described below. It is a stove evergreen tree, thriving in a compost of loam, sand, and peat. Firm cuttings will root in sand, in brisk bottom heat.

Heisteria—*continued.*

H. coccinea (scarlet). *fl.* white, small, twin or numerous, axillary; calyx dark purple or scarlet. Winter. *l.* alternate, entire, lanceolate, rounded at the base. *h.* 15ft. West Indies, 1822.

HELCIA. Included under **Trichopilia** (which *see*).

HELENIUM (*Helenion*, an old Greek name used by Hippocrates, and probably derived from Helen of Troy). ORD. *Compositæ*. A genus containing about eighteen species of ornamental hardy herbaceous annuals or perennials, inhabiting Central and North America. Receptacle chaffy, between the ray-florets only; pappus of five bristles; involucral bracts in one series, united at the base; ray-florets toothed at the apex. Leaves alternate, often decurrent, entire or few-toothed. The species are more or less strong-growing, and are, consequently, best suited for the margins of shrubberies or the back of herbaceous borders. In such situations, they may be extensively grown, and the abundance of flowers which they produce will prove valuable for decorative purposes. Propagated by divisions, or by seed.

H. autumnale (autumnal).* *fl.-heads* pure yellow, large, with long four to five-cut ray-florets. Autumn. *l.* smooth, lanceolate, 3in. to 4in. long, ½in. broad, acute at both ends. Stem branching at top. *h.* 4ft. to 6ft. North America, 1729. Perennial. A very showy and elegant species. (B. M. 2994.)

H. Hoopesii (Hoopes's). *fl.-heads* bright orange, about 2in. across; involucral segments long, narrow, acuminated. Summer. *l.* lanceolate, acuminated, smooth, stem-clasping. Stem simple. *h.* 2½ft. North America. Perennial.

H. nudiflorum (naked-flowered). *fl.-heads* pure yellow, loosely disposed, medium-sized, fragrant. Summer and autumn. *l.* alternate, linear-lanceolate. *h.* 2ft. to 3½ft. South United States. Perennial. *H. n. atropurpureum* (dark purple) is a variety with purple ray-florets.

H. quadridentatum (four-toothed). *fl.-heads* yellow; disk-florets four-toothed. May to October. *l.*, lower ones pinnatifid; upper entire, smooth. Louisiana, 1790. Annual or biennial. (B. R. 598.)

HELIAMPHORA (from *helios*, the sun, and *amphora*, a pitcher; in reference to the circular ascidia). ORD. *Sarraceniaceæ*. A monotypic genus. The species is a greenhouse herbaceous perennial. Probably this plant only yet exists in a single establishment in this country. Most likely it requires similar treatment to **Sarracenia** (which *see*).

H. nutans (nodding). *fl.* white, or pale rose-coloured, nodding, on an erect, few-flowered scape; sepals five, rarely four, spreading. *l.* radical, tubular, in the form of a pitcher with an oblique mouth, lined with deflexed hairs. *h.* 1ft. to 2ft. Roraima, 1883. (T. L. S. xviii. 29.)

HELIANTHEMUM (from *helios*, the sun, and *anthemon*, a flower). Sun Rose. Including *Fumana*. ORD. *Cistineæ*. A genus of showy, hardy, annual or perennial herbs or sub-shrubs, often prostrate. Nearly 150 forms have been described as species; but, according to Bentham and Hooker, only about thirty are entitled to specific rank. They are natives of North, Central, and South America, and the Mediterranean region; a few extend to other parts of Europe and Western Asia, four species being members of the British Flora. Racemes secund, sometimes corymbose, sometimes paniculate; and before the flowers expand, the racemes at the top are bent or twisted backwards, becoming gradually erect as the flowers open. Leaves opposite and alternate. All the species are of easy culture in a sandy-loam soil, and are best adapted for banks and rockwork. The annual species must be raised from seed. The perennials may be similarly increased; but it is better to trust to cuttings, which root readily in a sandy soil, if kept shaded until established. The following is a selection of the more important species and varieties.

Helianthemum—*continued.*

H. atriplicifolium (Atriplex-leaved). *fl.*, petals yellow, large; peduncles racemose, hairy. June. *l.* stalked, broad-ovate, bluntish, waved at the base, tomentose on both surfaces. Branches white from tomentum. *h.* 4ft. Spain, 1659. Shrub.

H. canadense (Canadian). *fl.* pale yellow, minute, crowded; peduncles very short, one to three-flowered. Summer. *l.* oblong-linear; margins usually revolute; under surface tomentose. Branches very erect, pubescent. *h.* 1ft. North America, 1823. Herbaceous. (S. C. 21.)

H. carolinianum (Carolina). *fl.* yellow, 1in. across. May and June. *l.* shortly stalked, lanceolate, denticulate, hairy. Base shrubby. *h.* 6in. to 12in. South United States. (S. C. 99.)

H. formosum (showy).* *fl.*, petals yellow, marked with a black spot at the base of each, large; peduncles villous. Summer. *l.* shortly stalked, obovate-lanceolate, tomentosely-villous; younger ones hoary. Branches canescent. *h.* 4ft. Portugal, 1780. Shrub. (B. M. 264; Gn. xxvi., 420, under name of *Cistus formosus.*)

H. Fumana (smoky). *fl.* bright yellow. June. *l.* linear, fleshy, thinly hairy. South-western Europe. An elegant sub-shrub, of Heath-like habit. (S. C. 16.)

H. globulariæfolium (Globularia-leaved). *fl.* citron-yellow, black-spotted, in dense racemes. Summer. *l.*, radical ones long-stalked, ovate-oblong, hairy, upper surface furrowed; cauline ones sessile, lanceolate. Stems ascending, almost simple, herbaceous. *h.* 9in. Spain and Portugal, 1752. (B. M. 4873, under name of *H. Tuberaria.*)

FIG. 195. FLOWERING BRANCH OF HELIANTHEMUM GUTTATUM.

H. guttatum (spotted). *fl.* yellow, with red spot at the base of each petal, in unilateral cymes. Summer. *l.* opposite, sessile, oblong-linear, hairy. *h.* 6in. Europe (Britain), North Africa, and West Asia. Annual. See Fig. 195.

H. halimifolium (Halimus-leaved).* *fl.* bright yellow, large, slightly spotted at the base of each petal. Summer. *l.* ovate-lanceolate, acute, wavy, pubescent. *h.* 3ft. to 4ft. Spain. Shrub. (S. C. 4.)

H. italicum (Italian). *fl.* yellow, small; racemes simple, hispid. Summer. *l.*, lower ones stalked, ovate; upper ones linear-oblong, almost sessile. Branches procumbent, long, hispid, shrubby. *h.* 3in. Europe, 1817.

H. lævipes (smooth-stalked). *fl.* yellow. Summer. *l.* linear, needle-like. *h.* 1ft. South-western Europe. A beautiful little shrub, requiring shelter during severe weather. (B. M. 1782, under name of *Cistus lævipes.*)

H. lavandulæfolium (Lavender-leaved). *fl.* yellow; racemes crowded. Summer. *l.* oblong-linear, with revolute margins; under surface tomentose, hoary. Stem shrubby, erect, branched; branches long, terete, canescent. *h.* 1ft. Mediterranean region, 1817.

Helianthemum—*continued.*

H. ocymoides (Ocymum-like). *fl.*, petals yellow, with a dark base, crenated; peduncles somewhat panicled, pilose. Summer. *l.* sessile, ovate-lanceolate, obtuse. Stem branched; branches, leaves, peduncles, and sepals beset with long loose hairs. *h.* 1ft. to 3ft. South-western Europe, 1800. Sub-shrub. (B. M. 5621.) *H. algarvense* (S. C. 40), *H. candidum* (S. C. 25), *H. rugosum* (S. C. 65), represent forms of this variable species.

H. polifolium (Polium-leaved). *fl.* white, marked yellow at the base; petals crenulated; racemes terminal, secund. Summer. *l.* oblong-linear, with revolute margins, tomentose on both surfaces. Stem shrubby, branched; branches procumbent, densely tomentose. Europe (Britain), North Africa. SYN. *H. pulverulentum.* (S. C. 88.) *H. roseum* is a beautiful variety, with rosy-red flowers. (S. C. 55.)

H. pulverulentum (powdery). A synonym of *H. polifolium.*

H. scoparium (broom). *fl.* yellow, small, by twos or threes at ends of branches, on naked pedicels; sepals five, three of which are oval and pointed, and two subulate; corolla twice as long as calyx. May and June. *l.* alternate, linear, without stipules. *h.* 3in. California, 1848. Perennial.

H. serpyllifolium (Thyme-leaved). A synonym of *H. vulgare ovalifolium.*

H. umbellatum (umbellate). *fl.* pure white, in a whorled raceme, ending in an umbel. June. *l.* linear-oblong, with revolute margins, ciliate, viscid when young. *h.* 9in. to 18in. Perennial. (S. C. 5.)

H. vineale (vineyard). *fl.* yellow; racemes simple. Summer. *l.* variable, obovate, ovate, or elliptical, pilose. Stem suffruticose, procumbent, branched, ascending, tomentose, evergreen. Europe, 1772.

H. vulgare (common).* *fl.* yellow; racemes loose; pedicels pilose. Spring and summer. *l.* scarcely revolute at the margins; under surface hoary; upper surface green, pilose. Stem shrubby, procumbent. Branches elongated. Europe (Britain), North Africa, and West Asia. (Sy. En. B. 168.) A curious variety, or (according to Bentham) an accidental deformity, occasionally seen in gardens, and supposed to have been originally found near Croydon, with small, narrow, deeply cut petals, has been figured under the name of *H. surrejanum.* The Rock-roses of our gardens are chiefly varieties of this species, which, under cultivation, varies much in the colour of its flowers. The following are amongst the most distinct of the innumerable forms:

H. v. barbatum (bearded). *l.* ovate or elliptic-lanceolate, clothed with long white hairs. (S. C. 73.)

H. v. hyssopifolium (Hyssop-leaved). *fl.* coppery-red (S. C 58) or saffron-coloured (S. C. 92). *l.* flat, linear-lanceolate or lanceolate; upper surface glossy. Of the one with coppery-red flowers, there is a double form.

H. v. macranthum (large-flowered). *fl.* whitish, yellow at the base; racemes terminal, secund, simple. Summer. *l.* flat, ovate-oblong, acutish, densely tomentose beneath, smooth above. Branches shrubby, procumbent, rather tomentose.

H. v. mutabile (changeable). *fl.* pale rose-colour, yellow at base, becoming almost white before petals fall. Summer. (S. C. 106.)

H. v. ovalifolium (oval-leaved). *fl.* yellow. *l.*, lower ones roundish or oval, glossy green above, white beneath; margins more or less revolute. SYN. *H. serpyllifolium.* (S. C. 60.)

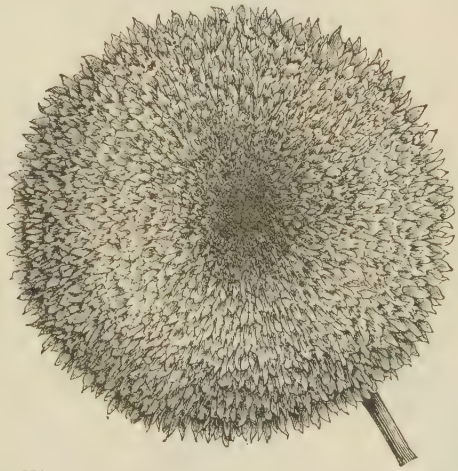


FIG. 196. FLOWER-HEAD OF HELIANTHUS ANNUUS GLOBOSUS FISTULOSUS.

HELIANTHUS (from *helios*, the sun, and *anthos*, a flower). Sunflower. Including *Harpalium.* ORD.

Helianthus—*continued.*

FIG. 197. HELIANTHUS ANNUUS CALIFORNICUS PLENISSIMUS, showing Habit and detached Single Flower-head.

Compositæ. A genus containing about fifty species of tall, hardy, annual or perennial herbs, natives, for the most part, of North America; a few, however, are found in Peru and Chili. Flower-heads very large; ray-florets yellow; disk-florets purple or violet. Leaves large, simple, scabrid. All the species are of easy culture in almost any moderately good garden soil. The taller-growing ones are best adapted for growing in a shrubbery, or in the back rows of herbaceous borders, where they will require plenty of space to fully develop. Propagated by divisions; or by seeds, sown either in pots, and the seedlings afterwards transplanted, or in the open ground, about March.

FIG. 198. FLOWERING BRANCH OF HELIANTHUS ARGOPHYLLUS.

Helianthus—*continued.*

H. angustifolius (narrow-leaved). *fl.-heads* about 1½in. across, numerously disposed in a long, leafy raceme. September and October. *l.* dark green, narrow, tufted, glossy. Stems slender. *h.* 2½ft. Perennial.

H. annuus (annual).* Common Sunflower. *fl.-heads* very large, varying in size and colour. Summer. *h.* 6ft. Western United States, 1596. (B. M. 2051.) Of the many varieties of this annual species, the finest is *globosus fistulosus* (see Fig. 196), the flowers of which are very large, and of a splendid, extremely double, globular form, when fully developed. It is best grown in a rich, deep soil. Other forms are: *californicus plenissimus* (see Fig. 197), *cucumerifolius*, *giganteus*, and *grandiflorus*.

H. a. macrocarpus (large-fruited). A cultivated race, with larger and lighter-coloured achenes, long cultivated in Russia, &c., for food and oil.

H. argophyllus (silver-leaved). *fl.-heads* yellow. Autumn. *l.* clothed with a soft, silky, silvery down. *h.* 6ft. Texas. This species is closely allied to *H. annuus*, into which it appears to degenerate under cultivation. Annual. See Fig. 198.

H. atrorubens (dark-red). *fl.-heads* scattered; disk dark red or purple; rays yellow, acuminated, entire. *l.*, radical ones flat, hairy; upper ones twisted and waved, hairy, tuberculated. Stems purple, rough, with whitish hairs. *h.* 2ft. to 3ft. United States, 1732. Perennial.

H. decapetalus (ten-petaled). *fl.-heads* about 2in. across, terminal, solitary, on slender, twiggy branchlets. Autumn. *l.*, lower ones somewhat ovate-acuminate, hardly 6in. long; upper ones 2in. to 3in. long; all somewhat obscurely serrate. *h.* 5ft. Perennial. (B. M. 3510.)

FIG. 199. FLOWERING BRANCH OF HELIANTHUS DECAPETALUS MULTIFLORUS.

H. d. multiflorus (many-flowered).* This is a very old garden plant, only known in cultivation. It has firmer leaves, larger heads, and more numerous bracts than *decapetalus*. See Fig. 199.

Helianthus—*continued.*

(B. M. 227, under name of *H. multiflorus.*) The common form is of dwarf habit, with double flowers.

H. d. multiflorus major only differs from ordinary *multiflorus* in its larger flower-heads.

H. diffusus (diffuse). A synonym of *H. rigidus.*

H. lenticularis (lenticular). *fl.-heads* yellow, large, drooping; scale of involucre expanded, scabrous on the back. August. *l.* alternate, petiolate, ovate, three-nerved, serrate. Stem hispid. *h.* 6ft. North America, 1827. (B. R. 1265.) This is a variety of the Common Sunflower, *H. annuus.*

H. mollis (soft). *fl.-heads* yellow. July to October. *l.* ovate, acuminate, three-nerved, closely-serrated, scabrous above, hoary and soft beneath. *h.* 4ft. North America, 1805. (B. M. 3689.)

FIG. 200. UPPER PORTION OF STEMS, AND DETACHED FLOWER-HEAD, OF HELIANTHUS ORGYALIS.

H. orgyalis (6ft. high).* *fl.-heads* yellow, comparatively small, numerous, forming a large panicle. Autumn. *l.* alternate, numerous, very narrow and recurved, 5in. to 8in. long, ¼in. to 1in. wide. *h.* 6ft. to 10ft. United States, 1879. Very graceful, and one of the best and most useful decorative autumnal-flowering plants. Perennial. See Fig. 200.

H. pubescens (downy). *See* **Wyethia angustifolia.**

H. rigidus (rigid).* *fl.-heads* glistening golden-yellow, about 4in. across, formed of a deep ray and small disk; ray-florets 1½in. long, ½in. broad, tips incurved, and edges reflexed; disk-florets chocolate colour; involucre scaly; peduncles long, hairy. August. *l.*, stem ones very hispid, lanceolate, slightly dentate; radical ones few, oval, 5in. or 6in. long. *h.* 3ft. North America. Perennial. SYN. *H. diffusus.* (B. M. 2020.)

H. tuberosus (tuberous). Jerusalem Artichoke. *fl.-heads* yellow. September and October. *l.* three-nerved, scabrous; lower cordate-ovate, upper ovate-acuminate, alternate; petioles ciliated at base. Roots creeping, and towards the end of autumn produce a number of round, irregular, reddish or yellow tubers, clustered together, and of about the size of an ordinary potato. *h.* 6ft. to 8ft. Upper Canada and United States, 1617. This was cultivated by the aborigines, and the tubers developed. It is certainly not South American, as stated in so many books. The common name of this species is supposed to be a corruption of the Italian *Girasole articocco*, or Sunflower Artichoke. For culture, *see* **Artichoke, Jerusalem.**

HELICHROA. *See* **Rudbeckia.**

HELICHRYSUM (an old Greek name used by Theophrastus; the latter part of the word, from *chrysos*, gold, refers to the colour of the flowers). Everlastings. SYN. *Elichrysum.* ORD. *Compositæ.* A genus comprising 260 species of greenhouse or hardy, herbaceous or shrubby plants, natives, for the most part, of the Cape of Good Hope. Flower-heads large, solitary; involucral bracts scarious, not silvery, spreading or recurved, or clustered and small with incurved bracts; pappus rough or sub-

Helichrysum—*continued.*

plumose. Very few species are grown in our gardens. Helichrysums succeed best in a rich loamy soil, either when grown in pots or planted out. The annual species, and the varieties (of which there are a good number) of *H. bracteatum*, may be readily raised from seed, sown in a light heat, in March, and afterwards transplanted, or in the open ground at the latter end of that month. The greenhouse and half-hardy perennial species may be propagated by cuttings, inserted in spring, in a close frame, without much heat. Flowers that are intended for drying should be gathered when partially unfolded, and suspended with their heads downward in a cool shed. Any that are required to ripen seed must be allowed to remain on the plants until naturally developed.

H. apiculatum (small-pointed). *fl.-heads* yellow, in small clustered corymbs. *h.* 1½ft. Australia, 1804. Plant covered with a silvery tomentum. Half-hardy perennial.

H. arenarium (sand-loving).* Yellow Everlasting. *fl.-heads* bright golden-yellow, disposed in a compound corymb. Summer. *l.* lanceolate, entire, stem-clasping, blunt and recurved at tips, with revolute edges; downy white on both surfaces. Stem upright, simple, downy. *h.* 6in. to 12in. Europe, 1739. Hardy herbaceous. The flowers of this species are very extensively used for decorative purposes, and are popularly known as Immortelles. They are also largely employed in the making of funeral wreaths, crosses, &c.

FIG. 201. FLOWERING BRANCH OF HELICHRYSUM BRACTEATUM.

H. bracteatum (bracteate).* *fl.-heads* very various, solitary, terminal. August. *l.* lanceolate, entire. *h.* 3ft. to 4ft. Australia, 1799. Half-hardy annual. See Fig. 201. *H. acuminatum*, *H. chrysanthum*, and *H. macrocephalum*, are mere forms of this species.

H. b. aureum (golden). *fl.-heads* golden-yellow. See Fig. 202.

H. b. bicolor (two-coloured). *fl.-heads* yellow. August. *l.* linear-lanceolate, acuminate, obtuse at the base, roughly ciliated; upper ones subulate. 1835. (B. R. 1814.)

H. b. compositum (compound) is a fine "double" strain, with various-coloured flower-heads. See Fig. 203.

H. b. macranthum (large-flowered). *fl.-heads* white, rose coloured outside. (B. R. 1838, 58.)

H. b. niveum (snowy).* *fl.-heads* white, yellow, large, solitary, terminal; scales of involucre white, conniving, ovate, mucronate. June. 1838. (B. M. 3857.)

Helichrysum—*continued.*

H. buphthalmoides (Buphthalmum-like). A synonym of *H. scorpioides.*

FIG. 202. HELICHRYSUM BRACTEATUM AUREUM, showing Habit and detached Flower-head.

FIG. 203. FLOWER-HEADS OF HELICHRYSUM BRACTEATUM COMPOSITUM.

H. ericæfolium (Heath-leaved). *fl.-heads*, outer involucre rough; inner flesh-coloured. March to August. *l.* sessile, linear. *h.* 1½ft. Cape of Good Hope, 1774. Greenhouse shrub. (B. M. 435, under name of *Gnaphalium ericoides.*)

FIG. 204. HELICHRYSUM FŒTIDUM, showing Habit and detached Single Flower-head.

H. felinum (feline). *fl.-heads* purple. May and June. *l.* lanceolate, sessile, three-nerved, naked above, woolly beneath.

Helichrysum—*continued.*

h. 3ft. Cape of Good Hope, 1791. Greenhouse shrub. (B. R. 243, under name of *Gnaphalium congestum.*)

H. fœtidum (fœtid). *fl.-heads* light yellow. June to September. *l.* amplexicaul, entire, acute, downy beneath. Stem branched. *h.* 2ft. Cape of Good Hope, 1692. Greenhouse herb. See Fig. 204. (B. M. 1987, under name of *Gnaphalium fœtidum.*)

H. frigidum (frigid). *fl.-heads* silvery white, about ½in. in diameter. May. *l.* small, silky-hairy. *h.* 3in. Corsica, 1879. Plant elegant with decumbent branches. Half-hardy. (B. M. 6515.)

H. grandiflorum (large-flowered). *fl.-heads* white; corymb stalked; involucre cylindrical. June to August. *l.* amplexicaul, ovate-oblong, three-nerved, woolly above. *h.* 3ft. Cape of Good Hope, 1731. Greenhouse sub-shrub. (A. B. R. 489, under name of *Gnaphalium grandiflorum.*)

H. graveolens (strong-scented). *fl.-heads* yellow, small, disposed in clusters. *l.* linear, sessile. Tauria, 1877. Plant woolly, half-hardy, herbaceous. (R. G. 889.)

H. Gunnii (Gunn's). A synonym of *H. scorpioides.*

H. Mannii (Mann's). *fl.* globose, 1in. across, numerous, disposed in a large convex umbel, 6in. to 8in. across, at the summit of the stem; involucre white, of numerous closely imbricated scales; disk-florets innumerable, bright yellow; pappus hairs slightly thickened upwards. September. *l.* close placed, spreading, lanceolate, acuminate, slightly tortuose. Stem brown, woody, naked below, becoming gradually herbaceous, and clothed with leaves upwards. *h.* 2ft. or more (in cultivation). Fernando Po and Cameroons, 1863. Greenhouse shrub. (B. M. 5431.)

H. plicatum (folded). *fl.-heads* white, corymbose, large. *l.* narrow, tapering into a long stalk. Macedonia, 1877. Plant woolly, forming prostrate, spreading, greyish tufts. An excellent hardy herbaceous plant for clothing dry, stony banks. (R. G. 889.)

H. scorpioides (scorpion-like). *fl.-heads*, involucre broadly hemispherical; bracts very numerous, the outer ones short, often tinged with brown, passing into the intermediate ones, of a bright yellow, usually narrow. *l.* from oblong-spathulate to linear, mostly acute, glabrous or scabrous above, loosely woolly underneath, the upper ones few and small. Stem ascending or erect, usually simple, often exceeding 1ft., and rather weak. Australia, 1838. Greenhouse herbaceous perennial. SYNS. *H. buphthalmoides, H. Gunnii.*

H. Stœchas. Goldy-locks. *fl.-heads* yellow, corymbose, crowded, shortly stalked. Summer. *l.* sessile, linear, obtuse, silvery underneath. Stems branching, spreading, covered with silvery down. *h.* 1ft. South Europe, 1629. Hardy evergreen sub-shrub.

HELICODEA ZEBRINA. A synonym of **Billbergia zebrina** (which *see*).

HELICODICEROS (from *helix, helikos*, spiral, *dis*, twice, and *keras*, a horn; in allusion to the basal divisions of the leaf twisting and standing erect, and thus somewhat resembling horns). ORD. *Aroideæ* (*Araceæ*). A hardy tuberous perennial herb, allied to *Arum.* It requires the protection of a frame in severe weather. For culture, *see* **Arum.**

H. crinitus (hairy-spathed).* *fl.* dark purple-brown; spadix cylindrical, shorter than the ovate, flat, brown spathe, which is hairy inside. April. *l.* pedate; lobes entire. *h.* 1ft. to 1½ft. Corsica, 1777. SYN. *Arum crinitum.* See Fig. 205.

HELICOID. Twisted, like a snail's shell.

HELICONIA (from *Helicon*, a mountain in Greece, consecrated to the Muses). ORD. *Scitamineæ.* A genus allied to *Musa*, containing about twenty-five species, all of which are natives of the tropical regions of the Western hemisphere. They are ornamental, but rarely-grown, stove herbaceous perennials, with inconspicuous flowers, borne on short spathes, and handsome foliage. Heliconias may be propagated from seed, but the best method is by division of the root-stock when growth commences in spring. Separate pieces may be inserted in 5in. pots, and grown on rapidly in a moist stove temperature, repotting into larger sizes as becomes requisite; or they may be planted out in the stove, if desired. A rich, loamy, open soil is best, and plenty of water should be applied during the growing season, withholding it when the plants die down, in winter. Shade must be given in summer, to prevent the sun injuring the foliage.

H. aureo-striata (golden-striped).* *l.* deep green, with the course of the parallel-curved veins from the costa to the margin traced out by yellow lines; elongate-ovate, cordate at the base. Stems striated with green and yellow. 1881. A noble plant. (I. H. n. s. 464.)

Heliconia—*continued.*

FIG. 205. HELICODICEROS CRINITUS, showing Habit and Young Unopened Spathe.

FIG. 206. HELICONIA BICOLOR, showing Habit and separate Inflorescence.

H. bicolor (two-coloured). *fl.* white, tipped with greenish; ovaries and spathes scarlet. *l.* long-stalked, gracefully arching. Brazil. See Fig. 206. (R. G. 172.)

H. Bihai (Bihai).* *fl.* red or orange-colour. July and August. *l.* on long petioles, ovate-lanceolate, some of which are slightly curved towards the edges. *h.* 12ft. West Indies, 1786. A handsome and graceful foliage plant. See Fig. 207. (B. R. 374.)

H. brevispatha (short-spathed). *fl.* white; spike short, of not more than four or five orange-red spathes, of which the inferior one is flowerless; the rest are much smaller and gradually shorter upwards. Summer. *l.* oblong, rather obtuse at the base, much acuminated at the apex, quite glabrous; petioles short. *h.* 3ft. South America, 1861. A very singular plant. (B. M. 5416.)

H. humilis (humble). *fl.* whitish-green, sessile; spathes five to seven, broadly boat-shaped, many-flowered, scarlet. *l.* oblong, acute at both ends; petioles long, exceeding the scape. Guiana, 1867. (B. M. 5613.)

H. metallica (metallic). *l.* elegantly drooping and recurved, broadly lanceolate; central rib, margins, and curving veins of a dark bronzy-red, which is also the colour of the under surface; petioles distichous, bronzy-red. New Grenada, 1862. (B. M. 5315.)

H. psittacorum (parrot-beaked).* *fl.* orange, in clusters upon short peduncles, within a lanceolate spathe. August. *l.* smooth, shining, alternate, lanceolate-elliptic, acuminate, many-nerved; footstalks membranous, sheathing the stem. Stem polished, straight, round; upper part naked; lower part clothed with leaves. *h.* 8ft. (in cultivation, 3ft). Jamaica, 1797. A beautiful plant. (B. M. 502.)

H. triumphans (triumphant).* *l.* oblong-acute, dark green, picked out with narrow blackish stripes running from the midrib to the margin at distant intervals. Introduced to Europe from Sumatra, in 1883 (but probably of New World origin). (G. C. n. s., xix., p. 565.)

Heliconia—*continued.*

FIG. 207. HELICONIA BIHAI.

H. vinosa (wine-red). *l.* large, broadly oblong, 1½ft. long, acuminated, bright green above, purplish beneath; upper surface transversely plicate or ridged. Stem slender, greenish. Columbia, 1871.

HELICTERES (from *helikter*, a twisted bracelet; so called from the screw-shaped carpels). ORD. *Sterculiaceæ*. A genus comprising about thirty species of pubescent or tomentose, stellate or branched, stove trees or shrubs, distributed over the warmer regions of both hemispheres, the majority being American. Flowers axillary, solitary or fasciculate. Capsules often stellato-tomentose. Leaves entire or serrate. The undermentioned is the species best known to cultivation in this country. Helicteres thrive in a mixture of loam and peat. Propagated by cuttings, taken off at a joint, and inserted in sand, under a glass, in heat.

H. Isora (Isora). *fl.* orange-red, axillary. September. *l.* much resembling, in form and substance, those of the Hazel Nut; when young, tomentose on both sides; the old leaves lose their pubescence on the upper surface. *h.* 6ft. India, Australia, &c. (B. M. 2061.)

HELINUS (from *helinos*, a tendril; in reference to its climbing habit). ORD. *Rhamneæ*. A genus comprising two or three species of climbing shrubs, natives of Abyssinia and South Africa. Flowers umbelled. Leaves alternate, entire, cordate. Branches slender, angular. *H. ovatus* is a greenhouse shrubby climber; it requires rich, sandy loam, and plenty of pot room. Increased by seeds; and by half-ripened cuttings, placed in sand, in gentle heat.

H. ovatus (ovate). *fl.* greenish, in umbels. *l.* stalked, suborbicular, mucronate, feather-nerved. Branches irregular; tendrils spiral. Natal, 1862.

HELIOCARPUS (from *helios*, the sun, and *karpos*, a fruit; the valves of the capsule are elegantly ciliated around on all sides). ORD. *Tiliaceæ*. A genus comprising four species of trees or shrubs, inhabiting tropical America. *H. americanus*, in all probability the only species yet introduced, is a stove evergreen shrub, thriving in sandy loam and fibry peat. Half-ripened

Heliocarpus—*continued.*

cuttings will root, during summer, in sand, under a bell glass.

H. americanus (American). *fl.* purple, small, disposed in cymes. July. *l.* cordate, serrate, three-lobed, simple. *h.* 14ft. to 20ft. 1733.

HELIOMERIS. A synonym of **Gymnolomia** (which *see*).

HELIOPHILA (from *helios*, the sun, and *phileo*, to love; in reference to the plants growing in sunny situations). ORD. *Cruciferæ*. A genus containing (according to Sonder) sixty species of annual herbs or sub-shrubs; but the number is considerably reduced by Bentham and Hooker. All are natives of South Africa. Racemes elongated. Leaves very variable. Stem round, branched. The annual species are the only sorts grown in our gardens; and these are of easy culture. Seeds should be sown in the open border, during March or April; or, for an earlier display, in March, in frames, and afterwards planted out.

H. amplexicaulis (stem-clasping). *fl.* varying from white to purplish, small. June to September. *l.*, lower ones opposite; upper ones alternate, cordate, stem-clasping, oblong, entire. *h.* 9in. 1774.

H. coronopifolia (buckhorn-leaved). *fl.* blue-violet, spreading. June to September. *l.* pinnate-parted; lobes linear, quite entire. *h.* 1ft. to 2ft. 1778.

H. pilosa (hairy). *fl.* blue. June and July. *l.* hairy; lower ones lanceolate, pinnatifid; upper ones linear, quite entire. *h.* 6in. to 12in. 1820. (B. M. 2526, under name of *H. stricta*.)

FIG. 208. HELIOPHILA PILOSA INCISA, showing Habit and detached Single Flower.

H. p. incisa (incised). *l.* linear-cuneate, trifid at the point, rarely five-fid; lobes linear or acuminate. See Fig. 208. (B. M. 496, under name of *H. arabioides*.)

HELIOPSIS (from *helios*, the sun, and *opsis*, like; in allusion to the appearance of the flowers). ORD. *Compositæ*. A genus comprising about six species of hardy herbs, perennials—with the exception of a couple of species of unintroduced annuals—two of which are from North America, and the third from Central and South America. Flower-heads rather large; corolla yellow. Leaves petiolate, all opposite or the upper ones rarely alternate. For culture, *see* **Helianthus.**

H. lævis (smooth). *fl.-heads* about 3in. across, terminal, on long stalks. Autumn. *l.* ovate-lanceolate, coarsely serrate. *h.* 3ft. to 6ft. North America, 1714. (B. M. 3372.) There is a variety, *scabra*, having a somewhat hoary involucre and roughish foliage.

HELIOTROPE. *See* **Heliotropium.**

HELIOTROPIEÆ. A tribe of *Borragineæ*.

HELIOTROPIUM (old Greek name used by Theophrastus, from *helios*, the sun, and *trope*, a turning; according to the ancients, it turned with the sun). Heliotrope; Turnsole. ORD. *Borragineæ*. A large genus (about 150 species have been described, although, in all probability, not more than 100 are entitled to specific rank)

Heliotropium—*continued.*

of ornamental, strigose, greenhouse or hardy annual herbs or sub-shrubs, rarely shrubs, widely dispersed throughout the tropical and sub-tropical regions, with eight species reaching to Europe. Flowers blue or white, small, in circinate, secund spikes; corolla salver-shaped. Leaves alternate, rarely sub-opposite. *H. peruvianum* and its varieties are amongst the most popular of cultivated plants, on account of the fragrant smell emitted by their flowers. The plants do not require any great amount of heat, but none are more quickly injured by cold, especially when this reaches the freezing point. They may be grown as dwarf decorative subjects, in small pots, or treated as large pyramid and standard specimens. Some of the varieties are very dwarf, and are useful for summer bedding. Old specimens of taller-growing ones are frequently found trained on the back wall of a warm greenhouse.

Cultivation. Heliotropiums, or Heliotropes, as they are more popularly called, may be readily increased from seeds or cuttings; the latter method being adopted with named varieties. Young growing points make the best cuttings; and early spring, or the month of August, is a good time for inserting them. If old plants are grown in heat, cuttings from them root quickly in a close frame, and their points may afterwards be used for increasing stock in preference to others not growing so vigorously. The young plants should be potted off singly, and grown on in a temperature of about 60deg., repotting in larger sizes as becomes requisite, and according to the shape or size of plant required. Cuttings intended for standards should be inserted in the autumn, and kept growing all the winter, with a single stem, until they reach the desired height, when the points may be stopped, and the side branches will soon form a head. Old plants may be grown as standards several years in comparatively small pots, by reducing and potting up again in new soil each year. The heads may be trained on trellises, or the branches merely tied in to each other. Large pyramids can be grown in one year by an autumn insertion of cuttings, and due attention. They should be transferred to the full-sized pots as soon as possible, in proportion to their growth, and each trained to a pyramid trellis of any ordinary size. Small decorative plants may be grown to flower in 5in. or 6in. pots, by keeping them pinched when young. Cuttings of varieties used for bedding, should be taken about the middle of August, inserted rather thickly in pots or pans, and placed in a close frame. These should be kept as a stock for spring propagating, and may then be thrown away, as young plants are preferable. Being extremely tender, none should be planted out until June, when the bedding season is nearly over. Standards or others, intended for winter flowering, are best placed outside in a warm position, in summer, to thoroughly ripen them. They should be housed by September, and kept in a temperature of about 55deg. in winter.

H. convolvulaceum (Convolvulus-flowered) * *fl.* white, sweet-scented, opening at night, generally opposite the leaves and terminal, short-peduncled; corolla limb ample, angulate-lobed. Summer. *l.* lanceolate, or sometimes nearly ovate, and sometimes linear, short-petioled. *h.* 2ft. New Mexico, 1867. An extremely showy hardy annual plant. (B. M. 5615.)

H. corymbosum (corymbose).* *fl.* lilac; spikes terminal, aggregate, corymbose; sepals long, subulate. May to September. *l.* oblong-lanceolate. *h.* 4ft. Peru, 1808. Greenhouse shrub. (B. M. 1609.)

H. curassavicum (Curaçoa). *fl.*, corolla limb ample, five-lobed; throat white, with a yellow eye, open; spikes mostly in pairs or twice-forked, densely flowered. June and July. *l.* linear-lanceolate, glaucous, smooth, opposite and alternate. *h.* 9in. West Indies, 1731. Stove sub-shrub. (B. M. 2669.)

H. indicum (Indian).* *fl.* bluish; spikes mostly single, dense-flowered, becoming 9in. to 1ft. long. June to August. *l.* ovate or oval, rather cordate, on margined petioles, obscurely serrate or undulate. *h.* 1ft. West Indies, 1713. Stove annual. (B. M. 1837.)

Heliotropium—*continued.*

H. luteum (yellow). *fl.* green, yellow, hypocrateriform. June to October. *l.* stalked. Stem shrubby. *h.* 6ft. North Africa, &c., 1779. Greenhouse. (B. R. 464, under name of *Tournefortia fruticosa.*)

FIG. 209. HELIOTROPIUM PERUVIANUM, showing Habit and detached Inflorescence.

H. peruvianum (Peruvian).* Common Heliotrope; Cherry Pie. *fl.* very fragrant; spikes terminal, branched, by threes and fours, rarely compound. *l.* petiolate, oblong-lanceolate, wrinkled, repand, hairy. Stem shrubby. Peru, 1757. Greenhouse. See Fig. 209. (B. M. 141.)

H. Voltaireanum (Voltaire's). *fl.* violet. A fine dwarf-growing hybrid. Greenhouse.

Varieties. Of the numerous varieties in cultivation, the subjoined list is a good selection, most of them being of continental origin. For reference and selection, the list is further divided into classes, according to the colour of the flowers and foliage. Those marked with an asterisk are recommended either for their general floriferous habit or for their highly-perfumed flowers.

ADÈLE, flowers dark lilac, trusses very large; leaves light green, rough; vigorous, free-flowering habit. BOUQUET PERFUMÉ, flowers dark, trusses medium size; very dwarf floriferous habit; an excellent variety. BUFFON, flowers pale lilac, trusses medium size; tall free-growing habit. FLEUR D'ETÉ, flowers lilac, trusses medium; foliage dark green; rather shy-flowering. MADAME BARBEY, flowers pale-coloured, trusses small; foliage pale green. MADAME DE BLOUAY, flowers pale lilac, trusses large; foliage pale green. MADAME E. SCHILLER, flowers dark-coloured, trusses small; leaves long, narrow. MADAME JUBBINGER, flowers and leaves very dark; floriferous habit; good. MADAME M. KOPFF, flowers whitish-lilac, trusses medium; leaves rough. MADAME P. ATHLES, flowers dark-coloured, trusses large, very freely produced; foliage very dark; good. MISS NIGHTINGALE, flowers dark lilac; dwarf floriferous habit; one of the best for bedding. M. VILGRAIN, flowers pale lilac, trusses immense; very free. ROSE CLAIR, flowers dark, trusses rather small but very plentiful; foliage intensely dark. WHITE LADY, flowers whitish-lilac, becoming nearly white under glass, trusses very large, free; fine variety for winter flowering.

Class I. Foliage and Flowers dark-coloured. *MADAME JUBBINGER, *MISS NIGHTINGALE, *ROSE CLAIR.

Class II. Foliage and Flowers pale-coloured. *BUFFON, MADAME BARBEY, MADAME DE BLOUAY, MADAME M. KOPFF, *M. VILGRAIN, *WHITE LADY.

Class III. Foliage green, Flowers dark-coloured. *ADÈLE, *BOUQUET PERFUMÉ, FLEUR D'ETÉ, MADAME E. SCHILLER, *MADAME P. ATHLES.

HELIPTERUM (from *helios*, the sun, and *pteron*, a wing; referring to plumed pappus). Including *Astelma* and *Rhodanthe.* ORD. *Compositæ.* A genus comprising forty-two species of half-hardy annual or perennial herbs, rarely small shrubs, of which twelve are from South Africa, and the rest from Australia. The genus is closely allied to *Helichrysum*, but is distinguished from it by having the hairs of the pappus plumose or feathery, instead of pilose (rough). Helipterums may be raised from seeds, sown rather thickly in the open ground, about the end of March. A rather rich soil and warm position should be selected. *H. Manglesii* is a pretty

Helipterum—*continued.*

and useful subject for pot culture. Seeds of it should be sown early in March, and placed in a warm house; when the young plants are large enough to handle, they should be pricked off, about eight in a 5in. pot, and grown on until they flower. This species may also be grown, with others, in the open ground.

H. canescens (hoary). This is the correct name of the plant described in this work as **Astelma canescens** (which *see*). (B. M. 420, under name of *Xeranthemum canescens.*)

H. Cotula (Cotula-flowered). *fl.-heads* yellow, or white with a yellow eye; involucral scales radiating, scarious, oblong or oblong-lanceolate; pappus hairs thickened upwards, very plumose; achenes smooth. May. *l.* scattered (opposite in very young, weak plants), 1in. long, filiform, terete. Stem terete, generally much branched from the base, but sometimes single; branches very slender. *h.* 6in. to 24in. West Australia. Annual. (B. M. 5604.)

H. gnaphalioides (Gnaphalium-like). *fl.-heads*, peduncles terminal, 2in. to 3in. long, cottony; involucre broadly cylindrical, of several imbricated reddish scales, cottony; receptacle faveolated; florets yellow, tubular, perfectly five-toothed. June. *l.* alternate, 2in. long, linear, almost filiform, waved, semi-cylindrical on the back, grooved in front, downy. Stems decumbent at base, throwing up numerous erect, downy branches. *h.* 1ft. to 1½ft. Cape of Good Hope, 1824. Perennial. (B. M. 2710, under name of *Gnaphalium modestum.*)

FIG. 210. HELIPTERUM HUMBOLDTIANUM, showing Habit and detached Inflorescence.

H. Humboldtianum (Humboldt's).* *fl.-heads* small, numerous, in dense terminal corymbs; involucre cylindrical; outer bracts closely imbricate, with very short, squarrose, scarious tips; inner ones with slightly woolly-ciliate claws, and radiating, rather rigid, petal-like laminæ, of a bright yellow, passing (when dry) into a metallic green. *l.* linear or linear-lanceolate, acute. *h.* 1ft. to 2ft. Western Australia, 1863. An erect woolly-white or at length nearly glabrous annual. See Fig. 210. SYN. *H. Sandfordii* (under which name it is figured in B. M. 5350).

H. incanum (white). *fl.-heads* large; involucral bracts yellow, pink, or white; peduncles leafless. *l.* linear, crowded at the base of the stem. *h.* 9in. Australia. Plant dwarf, tufted, branching, downy. Half-hardy annual. (B. M. 2881.)

H. Manglesii (Mangles').* *fl.-heads* showy, on long peduncles bearing a few scarious scales; involucre hemispherical, when fully out the outer bracts sessile and scarious, the inner ones with a narrow claw and oblong, radiating, petal-like lamina, varying from a pale to a rich pink, and sometimes deep purple at the base; florets yellow or purple. *l.* ovate-oblong or broadly-lanceolate, clasping the stem with rounded auricles. *h.* 1ft. to 1½ft. Western Australia. An erect, glabrous, corymbosely branched annual. (B. M. 3483, 5283, 5290; B. R. 1703; S. B. F. G. ser. ii. 295, under name of *Rhodanthe Manglesii.*)

H. Sandfordii (Sandford's). A synonym of *H. Humboldtianum.*

H. speciosissimum (very showy). This is the correct name of the plant described in this work as **Astelma speciosissimum** which *see*). (A. B. R. 51, under name of *Xeranthemum speciosum.*)

HELLEBORE. *See* **Helleborus.**

HELLEBORINE. *See* **Epipactis** and **Serapias**

HELLEBORUS (from *Helleboros*, the old Greek name used by Theophrastus; probably of foreign origin). Helle-

Helleborus—*continued.*

bore. ORD. *Ranunculaceæ.* A genus comprising about a dozen species of ornamental hardy, erect, perennial herbs, inhabiting South Europe and Western Asia. Flowers white, greenish, yellow or purple, rather large, solitary, or paniculate; sepals five, regular, usually persistent; petals small, tubular. Leaves palmate or pedate, leathery. Hellebores thrive in almost any ordinary garden soil, but a rich loam, with a moist, rather shady, perfectly drained situation, suits them best. A top-dressing of good rotten manure, about the end of March, after the plants have finished flowering, is very beneficial. Hellebores should be planted so that they may be conveniently shaded when in flower, as, being usually produced in winter and early spring, the blossoms—the white sorts especially—are damaged with mud splashes. *H. niger* and its varieties, popularly known as Christmas Roses, are largely cultivated for the use of their flowers, in a cut state, in mid-winter. The roots may be lifted, and placed in a gentle heat, under glass; but they should not be forced much. The flowers will be better, if only the protection of a frame or hand glass is afforded them, in the open ground; or they may be improved by cutting, and allowing them to expand in water, in a warm house. All are easily increased by root divisions, but the stock should be strong and healthy. Seeds may also be sown so soon as ripe; but this mode of propagation is very slow, and scarcely worth the trouble involved, unless new varieties are desired.

H. abchasicus (Abchasian). *fl.* green or purplish, nutant, about 2in. across; sepals oval, waved, not overlapping each other; petals numerous; anthers yellow. January to March *l.* about 1ft. in diameter, with five to seven spathulate-lanceolate, widely spreading, smooth, toothed leaflets. *h.* 1ft. Caucasus. Evergreen.

H. atrorubens (dark-red). *fl.* deep purple when young, with the edges and centre ultimately dull purple; sepals roundish, about 1in. long. March. *l.*, radical ones pedate; cauline ones almost sessile, palmate. Stems branched, two to four-flowered. *h.* 18in. South Europe, 1820. (B. M. 4581.)

H. caucasicus (Caucasian). *fl.* pale green; sepals much imbricated, about 1¼in. long. *l.* very glossy, oblong, 3in. to 4in. broad. *h.* 1½ft. Caucasus, 1853.

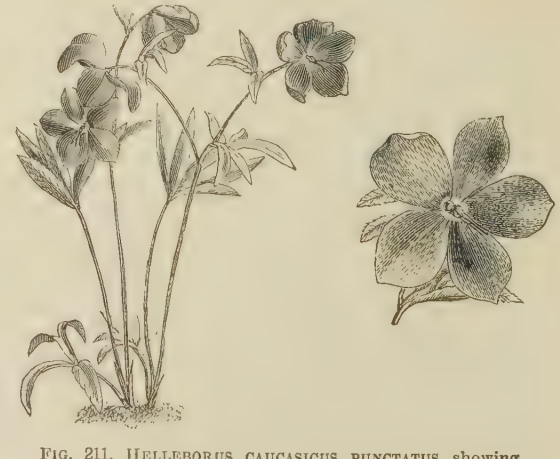


FIG. 211. HELLEBORUS CAUCASICUS PUNCTATUS, showing Habit and detached Single Flower.

H. c. punctatus (dotted). A garden hybrid, with rosy-coloured dotted sepals. See Fig. 211.

H. colchicus (Colchican). *fl.* deep bright purple; sepals somewhat round and flat, much imbricated; stamens yellow. January to March. *l.* very large, pedate, dentate, distinctly veined. Stems three to six-flowered. *h.* 18in. Asia Minor. (R. G. 293.)

H. fœtidus (fœtid). Bear's Foot. *fl.* green, nearly 1in. across, disposed in panicled cymes; sepals edged with brown, which turns to a purplish tint. December to April. *l.* alternate, persistent, dull green, small, pedate; segments linear, shallowly

Helleborus—*continued.*

inciso-serrate. *h.* 2ft. Europe (Britain). Very distinct and ornamental. See Fig. 212. (Sy. En. B. 45.)

FIG. 212. FRUIT OF HELLEBORUS FŒTIDUS.

H. lividus (livid). *fl.* pale green, ten to twenty in a deltoid corymb; sepals nearly flat and spreading. March. *l.* trifid, glabrous; segments oblong-lanceolate, acute, sharply toothed. Stems erect, bearing eight or ten leaves crowded near the base, below the inflorescence. *h.* 1½ft. Corsica. (B. M. 72.)

FIG. 213. HELLEBORUS NIGER.

H. niger (black).* Christmas Rose. *fl.*, when protected by glass, pure white, 2in. to 3in. across; scapes stout, leafless, one to four-flowered. Winter. *l.* radical, large, pedate, persistent; segments oblanceolate-rhomboid, shallowly incised. *h.* 6in. to 18in. Central and Eastern Europe, Western Asia, 1596. The roots of this species are occasionally used in medicine. See Fig. 213. (B. M. 8.) There are two or three varieties of this fine species: *altifolius* (see Fig. 214), usually known as *major*, and also as *maximus*, has very large flowers, measuring about 4in. across; it is one of the best of the genus. *angustifolius* (SYN. *minor*) has both foliage and flowers smaller than the typical species, and comes into bloom much earlier. There is also a form having foliage distinctly margined with white.

FIG. 214. HELLEBORUS NIGER ALTIFOLIUS.

Helleborus—*continued.*

H. odorus (sweet-scented). *fl.* green, sweet-scented, drooping, 2in. across; corymb three or four-flowered. February to April. *l.* pale green, veined with white, one or two in a tuft to a flowering stem, pedate; segments six to eight, lanceolate, regularly toothed. *h.* 1½ft. Eastern Europe, 1817. (B. R. 1643.)

H. o. purpurascens (purplish). *fl.* purplish-red, about 2in. across; sepals roundish, imbricated, incurved at the edges; stamens and anthers creamy-white. Stem one or two-flowered. *h.* 6in. to 10in. Hungary, 1817.

H. olympicus (Olympian).* *fl.* purplish; sepals round, about 1in. long and broad. Spring. *l.* digitate-pedate, or palmate, with five to seven linear-oblong, smooth, dentate-serrate lobes. Stems two or three-flowered. *h.* 2ft. Greece, 1840. See Fig. 215. (B. R. 1842, 58.)

FIG. 215. HELLEBORUS OLYMPICUS, showing Habit, and fully and partially expanded Flowers.

H. orientalis (Eastern). *fl.* rose-coloured, large; sepals much imbricated, spreading; flowering stems with two to six blossoms, and large, deeply palmately cut, foliaceous bracts. February to May. *l.* shortly pedate, persistent, pubescent beneath; segments seven to nine, oblanceolate-oblong, not palmately cut, serrate. *h.* 1ft. to 2ft. Greece, 1839. Several forms, usually described as species, are mere varieties of *H. orientalis*. Among others, the following may be enumerated: *antiquorum* differs from the type by its glabrous leaves, produced two in a tuft; flowers white, softly toned with pink and grey. *guttatus*, flowers 2in. across, white; sepals spotted with purple; leaves two in a tuft, with a flowering stem. Some of the hybrids of *H. orientalis* are: *elegans*, *iridescens*, and *punctatus*.

H. viridis (green). *fl.* bright green; flowering stem with five or six distinct blossoms, and large, deeply palmately cut, foliaceous bracts; sepals roundish-ovate. Spring. *l.* pedate, with crowded, oblanceolate, serrated segments. *h.* 1½ft. Europe (Britain), &c. (Sy. En. B. 44.)

HELMET FLOWER. A common name applied to **Aconitum, Coryanthes,** and **Scutellaria** (which *see*).

HELMHOLTZIA (named after Hermann Helmholtz, a celebrated Prussian professor, born in 1821). ORD. *Philydraceæ*. A genus of a couple of species of greenhouse tufted herbaceous perennials, one of which is from Australia, and the other—the one described below—from the Pacific Islands. They thrive in a well-drained sandy loam and peat compost, and require plenty of water. Increased by divisions, or by seeds.

Helmholtzia—*continued.*

H. glaberrima (very glabrous). *fl.* white, panicled. May. *l.* ensiform, acuminate, equitant, lin. broad. *h.* 3ft. 1873. (B. M. 6056, under name of *Philydrum glaberrimum.*)

HELMIA (named after C. Helm, a German ecclesiastic). ORD. *Dioscoreacæ.* A stove evergreen climber, now included under **Dioscorea** (which *see* for culture).

H. racemosa (raceme-flowered). *fl.* yellow, purple; male raceme axillary, solitary. *l.* scattered, cordate-ovate, acuminate, nine-nerved, glandular at base. Roots tuberous. *h.* 8ft. Central America, 1850.

HELMINTHOSTACHYS (from *helmins, helminthos,* a little worm, and *stachys,* a spike; in allusion to the arrangement of the sporangia). ORD. *Filices.* A curious and handsome stove fern, closely allied to *Botrychium.* Capsules in small crested clusters, which form a long loose spike. For culture, *see* **Ferns.**

H. dulcis (sweet). A synonym of *H. zeylanica.*

H. zeylanica (Cingalese). *rhiz.* thick, creeping. *sti.* often 1ft. long. *fronds,* barren segments palmato-pinnate, often in three principal divisions, which are stalked and again forked or pinnate, the ultimate divisions linear-oblong, 3in. to 4in. long, nearly lin. broad; fertile spike solitary, arising from the base of the barren segments, 3in. to 4in. long, ¼in. broad. Himalaya to Queensland, 1861. SYN. *H. dulcis.* (H. G. F. 28.)

HELONIAS (from *helos,* a marsh; habitat of species). ORD. *Liliaceæ.* A monotypic genus, the species being a pretty hardy herbaceous perennial, from North America. It thrives in a sandy fibry loam and peat compost, and in a moist, shaded situation. Increased slowly by divisions of the roots, or by seed.

H. bullata (bullate). *fl.* purplish-rose, small; lower ones with linear-lanceolate bracts; spike oval. Summer. *l.* radical, oblong-lanceolate, acute, veined, shorter than the flower stems. *h.* 1ft. to 1½ft. 1758. SYN. *H. latifolia.* (B. M. 747.)

H. latifolia (broad-leaved). A synonym of *H. bullata.*

HELWINGIA (named in honour of Georg. A. Helwing, a writer on the botany of Prussia). ORD. *Araliaceæ.* A genus consisting of but two species, one Himalayan and the other Japanese. They are glabrous trees, more curious than beautiful, and scarcely worth cultivating, except in botanical collections.

H. ruscifolia (Ruscus-leaved). *fl.* small, clustered on the midrib of the leaves; perianth three to four-parted, with ovate spreading segments. *fr.* drupaceous. *l.* alternate, petiolate, acuminate, stipulate. Japan. A low tree. The young leaves are used in Japan as a vegetable (S. Z. F. J. 86.)

HELWINGIACEÆ. A tribe of *Araliaceæ.*

HEMEROCALLEÆ. A tribe of *Liliaceæ.*

HEMEROCALLIS (old Greek name used by Theophrastus, from *hemero,* a day, and *kallos,* beauty; in reference to its short-lived splendour). Day Lily. ORD. *Liliaceæ.* Very ornamental hardy herbaceous perennials. Flowers corymbose; segments of the perianth united at the base into a narrow tube, inclosing the free ovary. Leaves long, narrow, radical. All the species are of easy culture in ordinary garden soil, and are admirably adapted for shrubberies, or for clumps. The flowers are somewhat ephemeral, but they are produced successively and in abundance. Increased by divisions.

H. alba (white). A synonym of *Funkia subcordata.*

H. cærulea (blue). A synonym of *Funkia ovata.*

H. cordata (heart-shaped). A synonym of *Funkia subcordata.*

H. disticha (two-ranked). A synonym of *H. fulva.*

H. Dumortieri (Dumortier's).* *fl.* orange-yellow, tinged with brown on the outside, large, about 2in. long; scape erect, two to four-flowered. Summer. *l.* long, narrow, tapering, 1ft. to 1½ft. long. *h.* 1ft. to 1½ft. Japan and Eastern Siberia. Very closely allied to *H. minor.* SYNS. *H. rutilans* and *H. Sieboldii.* (Ref. B. 213.)

H. flava (yellow).* *fl.* orange-yellow, very fragrant, erect; perianth segments flat, veinless. Summer. *l.* numerous, narrow, 2ft. to 2½ft. long, keeled. *h.* 2ft. to 3ft. South Europe to Western Siberia and Japan, 1596. (B M. 19.)

H. fulva (tawny).* *fl.* large, about 4in. wide, inodorous, few in a cluster; perianth segments venous and wavy. Summer. *l.* broad, long, keeled. *h.* 2ft. to 4ft. South Europe to Japan, 1596. SYN. *H. disticha.* See Fig. 216. (B. M. 64.) *H. Kwanso* is a

Hemerocallis—*continued.*

FIG. 216. HEMEROCALLIS FULVA.

variety with large double bronzy orange-coloured flowers (R. G. 500); of this form, there is also a sub-variety, with handsome variegated foliage.

H. graminea (grass-like). A synonym of *H. minor.*

H. japonica (Japanese). A synonym of *Funkia subcordata.*

FIG. 217. HEMEROCALLIS MIDDENDORFII, showing Habit and detached Head of Flowers.

H. Middendorfii (Middendorf's).* *fl.* deep golden-yellow, three or four in a terminal head; perianth segments flat, with branched veins. Summer. *l.* long, rather broad. *h.* 2ft. to 3ft. Eastern Siberia to Japan. See Fig. 217. (R. G. 522.)

H. minor (lesser).* *fl.* yellow, slightly tinged with green, rather small, and slightly fragrant; three inner perianth segments wavy. Summer. *l.* very narrow, keeled, pointed. *h.* 4in. to 8in. Siberia, Northern China, and Japan, 1759. SYN. *H. graminea.* (A. B. R. 244.)

H. plantaginea (Plantain-like). A synonym of *Funkia subcordata.*

H. rutilans (ruddy). A synonym of *H. Dumortieri.*

H. Sieboldii (Siebold's). A synonym of *H. Dumortieri.*

HEMIANDRA (from *hemi*, a half, and *andros*, a male; alluding to the dimidiate anthers). ORD. *Labiatæ*. A genus comprising three species of greenhouse shrubs or sub-shrubs, inhabiting South-west Australia. Flowers white or pink, axillary, solitary, with a pair of bracts under the calyx. Leaves opposite, entire, narrow, rigid, pungent-pointed. The species thrive in a sandy loam and peat compost. Propagated by cuttings, made of half-ripened wood, and inserted in sand, under a bell glass, during April.

H. pungens (stinging). *fl.* white or pink, with darker spots; calyx two-lipped; corolla tube exserted and dilated into a broad throat. May. *l.* sessile, linear or linear-lanceolate, rigid, acute, with pungent points. *h.* 1ft. to 2ft. A diffuse or spreading rigid shrub. The following, according to Bentham, are but forms of above: *H. brevifolia*, *H. emarginata*, *H. glabra*, *H. hirsuta*, and *H. rupestris*. (L. J. F. 126.)

HEMICHÆNA (from *hemi*, half, and *chaino*, to gape; in allusion to the two-lipped corolla). ORD. *Scrophularineæ*. A monotypic genus. The species is a handsome half-hardy shrub. It thrives in a loam and peat compost. Ripened cuttings will root, under a hand glass, in bottom heat.

H. fruticosa (shrubby). *fl.*, cymes usually three-flowered, much shorter than the leaves; calyx ⅛in. long, tubular; corolla golden-yellow. July. *l.* opposite, 4in. to 8in. long, 2in. to 2½in. broad, oblong-lanceolate, acuminate, irregularly or doubly toothed, dark green, pubescent on both surfaces. *h.* 3ft. to 5ft. Guatemala and Costa Rica, 1873. (B. M. 6164.)

HEMICLIDIA BAXTERI. A synonym of **Dryandra falcata** (which *see*).

HEMIDICTYUM. *See* **Asplenium.**

HEMIMERIS (from *hemi*, half, and *meris*, a part; the upper lip of the corolla is nearly obsolete). ORD. *Scrophularineæ*. A genus comprising about four species of annual herbs, natives of Southern Africa. Corolla yellow, expanded, sub-bilabiate, four-cleft, the upper segment very shortly emarginate, the lower segment very large, the lateral short and wide; calyx five-parted; peduncles axillary, one-flowered, deflexed after flowering. Leaves opposite. *H. montana*, perhaps the only species yet introduced, is a greenhouse plant, of easy culture in loam and peat. It may be increased by seeds.

H. montana (mountain). *fl.* scarlet, terminal and axillary; corolla rotate, ringent. July. *l.* opposite, ovate, serrated. *h.* 6in. Cape of Good Hope, 1816.

FIG. 218. HEMIONITIS PALMATA.

HEMIONITIS (old Greek name used by Dioscorides, from *hemionos*, a mule; supposed to be barren). ORD. *Filices*. A genus comprising eight species of stove ferns, found in both hemispheres. Sori continues along the veins, and copiously reticulated. The species are admirably suited for growing in Wardian cases. For culture, *see* **Ferns.**

H. cordata (heart-shaped). *cau.* erect. *sti.*, of the barren fronds, 2in. to 4in. long; of the fertile ones, about 1ft. long, densely fibrillose at base. *fronds* 6in. to 9in. long, 1in. to 2½in. broad, ovate or oblong-lanceolate, apex acuminate, edge sub-entire, base narrowed. *sori* confined to the veins. India, &c.

H. palmata (palmate). *cau.* erect. *sti.*, of barren fronds, 4in.; of the fertile one, 6in. to 12in. long, hairy. *fronds* 2in. to 6in. each way, palmate, with five nearly equal lanceolate divisions; both surfaces villose. West Indies, &c., 1793. See Fig. 218. (H. E. F. 53.)

H. pinnata (pinnate). *sti.* 6in. to 9in. long, glossy, dark chestnut-brown, clothed with soft yellowish hairs. *fronds* 5in. to 6in. long, 3in. to 4in. broad, the apex deeply pinnatifid, below this two or three pairs of distinct pinnæ, the upper ones oblong-lanceolate, the lowest larger and forked at the base, all repand. Jamaica.

HEMIPHRAGMA (from *hemi*, half, and *phragma*, a partition; referring to the division of the capsule). ORD. *Scrophularineæ*. A monotypic genus, the species being a nearly hardy prostrate herb, often spreading to a great extent. It thrives in a well-drained loam, and, provided it is sheltered in a cold frame, during winter, succeeds without much care.

H. heterophyllum (variable-leaved). *fl.* pink, small, usually sessile and solitary; corolla campanulate, five-lobed. Summer. *fr.* fleshy, black. *l.*, principal ones along the branches, small, rounded, cordate, with dense clusters of short, subulate, secondary leaves in their axils. Himalayas.

HEMISTEMMA. Included under **Hibbertia** (which *see*).

HEMITELIA (from *hemi*, half, and *telia*, a lid; in reference to the shape of the indusium). ORD. *Filices*. A genus of about thirty species of very beautiful stove and greenhouse tree ferns. Fronds ample, pinnate or decompound. Sori globose, dorsal, upon a vein or veinlet; receptacle elevated; involucre a scale situated on the under side of the sorus, of variable size, shape, and texture. For culture, *see* **Ferns.**

H. capensis (Cape). *cau.* 12ft. to 14ft. high, scaly at base, often bearing multifid pinnæ. *fronds* ample, sub-membranaceous, bi-tripinnate; primary pinnæ petiolate, ovate-oblong; pinnules sub-sessile, 2in. to 3in. long, ½in. wide, oblong-acuminate, deeply pinnatifid or again pinnate; lobes linear-oblong, acute, strongly serrated. *sori* frequently solitary at base of lobe or pinnule, rarely three or four; receptacle large, prominent. South Africa, Brazil, Java. Greenhouse.

H. grandifolia (large-fronded).* *sti.* aculeated. *fronds* ample, pinnated; pinnæ sessile, 1ft. to 1½ft. long, elongate-oblong, acuminated, 1in. to 2in. broad; lobes broad-oblong, obtuse, serrated at the apex. *sori* on the free veins, in a continual line, intermediate between the costule and the margin. West Indies, &c., 1852. Stove.

H. horrida (horrid). *sti.* strongly aculeated. *fronds* 7ft. to 10ft. long, pinnate; pinnæ sessile, 1ft. to 2ft. long, broad, oblong-lanceolate, deeply pinnatifid; lobes 3in. long, oblong-lanceolate, acuminate. *sori* on the free veinlets, forming a continued line just within the margin. West Indies, &c., 1843. Stove.

H. Karsteniana (Karsten's). *sti.* muricated and scaly at the base. *fronds* ample, pinnated; pinnæ sessile, 6in. to 12in. long, 2in. broad. *sori* in two oblique lines, meeting towards the rachis. Venezuela. Stove.

H. multiflora (many-flowered). *sti.* muricated, scaly. *fronds* ample, tripinnatifid; pinnæ oblong-lanceolate, 1ft. to 1½ft long; pinnules 3in. to 4in. long, ligulate, nine to ten lines broad, cut down to a narrow wing. *sori* small, medial. South America, 1824. Stove.

H. setosa (bristly). *sti.* short, grey, muricated; basal scales dark brown; rachises grey-stramineous, naked, smooth. *fronds* ample, tripinnate; pinnæ oblong-lanceolate, 1ft. to 1½ft. long, lower diminished, lowest dimorphous, with pinnated subulate segments; pinnules ligulate, 3in. to 4in. long, ¾in. broad, cut down to rachis below; segments ⅛in. broad, bluntish, falcate, barren, broad, fertile, narrower; both sides green, glabrous. *sori* costular; involucre small, depressed, glabrous. Brazil. Stove.

H. Smithii (Smith's).* *sti.* below densely crinite, with rigid, elongated, serrulated scales; rachis and costa below sparsely pilose, with lax, rufous, deciduous scales above, strigoso-villous. *fronds* bipinnate; primary pinnæ linear-elongate, acute, sub-falcate, serrated or crenate, very glabrous, the costules beneath paleaceous or pilose or glabrous. *sori* on the forking of the veins; involucre hemispherical. New Zealand. Arboreous, unarmed. Greenhouse. SYN. *Cyathea Smithii*.

Hemitelia—*continued.*

FIG. 219. HEMITELIA SPECIOSA.

H. speciosa (showy).* *cau.* 20ft. to 24ft. high. *sti.* tuberculate-submuricate. *fronds* ample, pinnate, very long, pinnatifid at the extremity; pinnæ firm, satiny, 8in. to 12in. long, 1in. to 1½in. broad, elongato-ensiform, acuminate. *sori* arranged in a sinuous continued chain or line just within the margin. Tropical America. Stove. See Fig. 219.

HEMLOCK. *See* **Conium.**

HEMLOCK SPRUCE. *See* **Tsuga canadensis.**

HEMP. The name of various valuable fibres employed for manufacturing purposes. The common name for *Cannabis sativa.*

HEMP AGRIMONY. *See* **Eupatorium cannabinum.**

HEN AND CHICKENS. A name given to a proliferous form of the Daisy, **Bellis perennis** (which *see*).

HENBANE. *See* **Hyoscyamus niger.**

HENFREYA SCANDENS. A synonym of **Asystasia scandens** (which *see*).

HENNA PLANT. *See* **Lawsonia alba.**

HEP, or HIP. The fruit of the Dog Rose, *Rosa canina,* and other species of *Rosa.*

HEPATICA. *See* **Anemone Hepatica.**

HEPIALUS HUMULI. *See* **Otter Moth.**

HEPTAPLEURUM (from *hepta,* seven, and *pleuron,* a rib; in allusion to the ribbed fruit). SYNS. *Paratropia* and *Sciadophyllum.* ORD. *Araliaceæ.* A large genus (about sixty species have been described) of tall shrubs or trees, widely distributed from Australia to Africa. Flowers pentamerous or hexamerous, collected into large panicles of racemes or umbels. Leaves alternate, digitate, compound or decompound. For culture, *see* **Aralia.**

H. polybotryum (many-clustered). *fl.* green, small racemes 1ft. and upwards long, covered with minute, very deciduous, stellate pubescence. Winter. *fr.* globose, five-celled, the size of a peppercorn. *l.* alternate, digitate; petiole 5in. to 8in. long, slender, swollen at the base and apex, warted in the lower half; leaflets five to seven, 6in. to 8in. long, oblong-ovate to obovate-oblong, caudate-acuminate, quite entire; base rounded or cuneate. Stem covered with hemispheric warts. Java, 1860. A slender, sparingly-branched, large stove shrub. (B. M. 6238.)

Heptapleurum—*continued.*

H. venulosum (veined). *fl.* greenish. *l.*, leaflets entire, acuminate. India. A small glabrous tree or climbing shrub. Stove.

HERACLEUM (*Heracleon,* the old Greek name of the plant; so called in honour of Heracles, or Hercules). Cow Parsley; Cow Parsnip. ORD. *Umbelliferæ.*

FIG. 220. LEAF OF HERACLEUM SETOSUM.

A genus comprising about seventy species of strong, coarse-growing, hardy biennial or perennial herbs, from

FIG. 221. HERACLEUM SIBIRICUM.

the mountains of Central and Southern Europe, and especially Asia, with a single North American one. Flowers white; the petals of the outer ones of each umbel larger. Leaves dissected, with large segments. Although long

Heracleum—*continued.*

known to cultivation, Heracleums are not possessed of any very special recommendations. They are best adapted for growing in shrubberies, rough parts of pleasure grounds, or on the margins of water, being too coarse for the flower garden. They succeed in almost any kind of soil. Increased readily by seeds, or by divisions. The species are much confused.

H. giganteum (gigantic). A synonym of *H. villosum.*

H. setosum (bristly). *l.* ternate; leaflets petiolate, distantly five-lobed; lobes dentate. Stem, petioles, and leaves hispid. South Europe See Fig. 220.

FIG. 222. UMBEL OF HERACLEUM SIBIRICUM.

H. sibiricum (Siberian). *fl.* yellowish, not radiating; umbels large. Summer. *l.* pinnate, rough from hairs; leaflets ovate or oblong. *h.* 5ft. to 6ft. Europe, Asia, 1789. See Figs. 221 and 222.

H. villosum (villose). *fl.* white; umbels many-rayed. *l.* pinnatifid, deeply toothed. Stem 10ft. to 12ft. high. Caucasus, 1820. This species has, of late years, been extensively cultivated, on account of its large size and commanding appearance. SYN. *H. giganteum.*

HERBACEOUS. Thin, green, and cellular, as the tissue of membranous leaves. Also, producing an annual stem from a perennial root.

HERBACEOUS PLANTS. A term generally applied to any border perennials which are not shrubby in habit.

HERBARIUM. A collection of dried plants, systematically arranged.

HERBERTIA (named after Dr. Wm. Herbert, 1778-1847, once Dean of Manchester, and a distinguished botanist, famous for his knowledge of bulbous plants). ORD. *Irideæ.* A genus (now referred by Bentham and Hooker to *Alophia*) of some half-dozen species of pretty half-hardy bulbous plants, allied to *Tigridia*; natives of Texas, Chili, and South Brazil. The species are rarely seen in gardens, and, in all probability, those described below are the only ones yet introduced. Flowers blue or yellow, pretty, produced at the top of a short scape; perianth short-tubed, six-parted, the outer segments triangular, acute, and reflexed, and the shorter inner ones rounded and erect. The species thrive in sandy loam and peat. Propagated by seeds, or by offsets.

H. cærulea (blue).* *fl.*, peduncles shorter than the bracts; claws of sepals white, blue-dotted; segments blue, spotted; petals blue, acute; anthers and stigmas short. *l.* grass-like, ribbed, narrowed to both ends. *h.* 6in. Texas. (B. M. 3862, Fig. 3.)

H. Drummondiana (Drummond's). *fl.* violet; sepals spotted with white on claws; petals small, recurved. June to August. *l.* broad, plicate, 6in. long. Texas, 1839.

H. pulchella (neat). *fl.* blue, purple; perianth segments bearded at base. July. *l.* linear-ensiform, acute at both ends, plicate. *h.* 9in. Chili and South Brazil, 1827. (B. M. 3862, Figs. 1 and 2.)

HERB OF GRACE. *See* **Ruta graveolens.**

HERB-PARIS. *See* **Paris quadrifolia.**

HERB-PATIENCE. *See* **Patience.**

HERB-ROBERT. *See* **Geranium Robertianum.**

HERBS. In many gardens, the cultivation of Herbs does not receive the attention their usefulness deserves. Some sorts are rarely required, beyond a small portion of their leaves for flavouring; still, in many cases, the flavour cannot be obtained from any other material. Those which are herbaceous perennials—Horehound and Mint, for instance—should be cut on a dry day, in summer, when the flowers are just fully opened, and dried slowly in a cool shed for winter use. The annuals and evergreen perennials are best if procurable in a green state; but several of them answer their purpose when dried, and some should, consequently, be kept in reserve. Herbs should always be dried slowly, and not placed in the sun nor in fire heat. The flavour may be preserved much better by rubbing off the leaves when they are quite dry, and corking them close in wide-mouthed bottles. A piece of ground specially devoted to Herbs, is the best arrangement in any garden; at least, for the cultivation of those of which only a few plants need be kept. Plenty of room should be allowed for getting amongst them to gather any particular sort, and to keep the soil hoed. Part of the space might be devoted to the annual sorts, in preference to placing them amongst other crops in different parts of the garden. Parsley requires special treatment and attention, as it is always of great importance for garnishing. The following list comprises most of the useful Herbs in cultivation for flavouring purposes, &c.: Angelica, Balm, Basil (Bush and Sweet), Borage, Burnet, Carraway, Chamomile, Chervil, Chives, Coriander, Dill, Fennel, Horehound, Hyssop, Lavender, Marigold, Marjoram (Sweet), Mint, Parsley, Pennyroyal, Purslane, Rosemary, Rue, Sage, Savory (Summer and Winter), Southernwood, Tansy, Tarragon, Thyme, and Wormwood.

HERCULES' CLUB. *See* **Zanthoxylum clava-Herculis.**

HERITIERA (named after Charles Louis L'Héritier, 1746-1800, a celebrated French botanist). Looking-glass Tree. SYN. *Balanopteris.* ORD. *Sterculiaceæ.* A genus comprising about three species of stove evergreen trees, found on the shores of tropical Asia and Australia. Flowers unisexual, small, disposed in axillary panicles. Leaves undivided, coriaceous, penninerved, silvery-white underneath (whence the common name). Heritieras thrive in sandy loam. Large ripened cuttings will root freely in sand, under a glass, in moist heat.

H. littoralis (shore). *fl.* reddish. *l.* large, coriaceous, oval-oblong, rounded at the base, silvery beneath. Tropical coasts of Old World, 1780.

H. macrophylla (large-leaved).* This resembles *H. littoralis*, but has larger leaves and sub-erect fruit. India, &c.

HERMANNIA (named after Paul Hermann, 1646-95, once Professor of Botany at Leyden). ORD. *Sterculiaceæ.* A large genus of ornamental greenhouse evergreen shrubs, generally clothed with starry tomentum. Flowers usually yellow, drooping; peduncles axillary, and few-flowered. Leaves dentate or incised. About eighty species have been described, but very few are in cultivation. Three are natives of Mexico or Texas, four of tropical Africa or Arabia; all the rest are extra-tropical South African. For culture, *see* **Mahernia.**

H. althæifolia (Mallow-leaved). *fl.* dark yellow or sulphur-coloured; peduncles solitary or twin, two or three-flowered, longer than the leaves. March to July. *l.* tomentose, obovate, plaited, crenate. *h.* 3ft. Cape of Good Hope, 1728. (B. M. 307.)

H. flammea (flame).* *fl.* orange-coloured or red; peduncles one or two-flowered; racemes terminal. Summer. *l.* smooth, wedge-shaped, lanceolate, truncated, and toothed at the apex. *h.* 1ft. to 3ft. Cape of Good Hope, 1794. (B. M. 1349.)

HERMANNIEÆ. A tribe of *Sterculiaceæ.*

HERMAPHRODITE. Containing both male and female organs.

HERMINIERA (from *hermine*, a bedpost; in allusion to the shape of the stems). Syn. *Œdemone*. Ord. *Leguminosæ*. A monotypic genus, the species being a tall stove shrub. It thrives best if the pot be partially submerged in a warm-water tank. Propagated by seeds.

H. Elaphroxylon (Elaphroxylon). *fl.* large; corolla yellow, papilionaceous; calyx two-lipped; stamens in two bundles of five each, with uniform anthers. *l.* impari-pinnate; leaflets exstipellate. Tropical Africa. This plant grows in the beds of shallow stagnant rivers of the Upper Nile country, sometimes in such thick masses as to impede navigation. It is the "Ambash," or Pith-tree, so frequently mentioned in books of tropical African travels.

HERMINIUM (from *hermin*, the foot of a bed; in allusion to the knob-like shape of the root). Musk Orchis. Ord. *Orchideæ*. A genus comprising but a few species of curious and interesting orchids, all natives of the temperate or alpine regions of Europe and Asia. They are closely allied to *Orchis*, but the perianth has no spur, and the anther cells are distant at their base, the glands of the stalks of the pollen masses protruding below the cells. *H. Monorchis*, the commonest and most widely-spread species, is best grown on dry chalky banks. It may be propagated by divisions.

H. Monorchis (one-bulbed). *fl.* greenish-yellow, small, numerous, with a musky odour; spike dense; lip without a spur, deeply three-lobed. July. *l.* radical, two, oblong or lanceolate. *h.* 3in. to 6in. Europe (Britain), Siberia, Himalaya. (Sy. En. B. 1466.)

HERNANDIA (named after Francisco Hernandez, physician to Philip II. of Spain, and a writer on the Flora of Mexico). Jack-in-a-Box. Ord. *Laurineæ*. A genus comprising five or six species of elegant stove evergreen trees, widely dispersed throughout the tropical regions of both hemispheres. Flowers yellowish, monœcious, in panicles; sepals petaloid. Leaves cordate, peltate, smooth. Hernandias require a compost of sandy loam and peat. Ripened cuttings, with leaves intact, root freely in sand, under a glass, if placed in brisk bottom heat. Probably the only two species now in cultivation are those here described.

H. Mœrenhoutiana (Mœrenhout's).* *fl.* dirty yellow, three in each involucre, two males and one female; peduncles axillary, equalling the leaves, nearly glabrous. October. *l.* coriaceous, 3in. to 5in. long, alternate, long-petioled; young ones elliptic; old ones broadly ovate-cordate, obtuse, entire, glabrous above, the nerves and midrib beneath pilose. Pacific Islands, 1869. A small tree. (B. M. 5839.)

H. sonora (sounding). *fl.* whitish-green, corymbose. *l.* simple, roundish, with a lively red centre. *h.* 50ft. India, 1693. This species forms a very handsome plant for sub-tropical gardening, for which purpose it is much employed on the Continent. The leaves produce a juice that is a powerful depilatory; it destroys hairs without pain wherever it is applied.

HERNIARIA (from *hernia*, a rupture; in reference to the supposed effect of the plant in curing rupture). Ord. *Illecebraceæ*. A genus consisting of eight or ten species of herbs, either small, or with a perennial stock of short duration. They are natives of Central and Southern Europe, Western Asia, as far as North-west India and Northern Africa; one species being also found in South Africa. Flowers green, small, granular, crowded in little axillary cymes. Leaves opposite. None of the species are of much interest from a horticultural point of view, and the only one worth mentioning here is *H. glabra*, which is sometimes used for carpet-bedding. For culture, *see* **Paronychia.**

H. glabra (glabrous). Rupturewort. *fl.* green, small. Summer. *l.* small, opposite, oblong-obovate, or rarely orbicular. Stems much branched, spread along the ground to the length of a few inches. Europe (Britain), North and West Asia. (Sy. En. B. 1171.)

HERON'S BILL. A general name for the British species of *Erodium* and *Geranium*.

HERPESTIS (from *herpestes*, anything that creeps; in allusion to the habit of the species). Ord. *Scrophularineæ*. This genus comprises about fifty species of erect, diffuse, prostrate, or aquatic perennial herbs,

Herpestis—*continued.*

natives of various parts of America, Africa, Australia, or Southern Asia, few of which are in cultivation. Flowers axillary, sessile or pedicellate, one to three together. Leaves opposite entire, toothed, or in the aquatic species submerged, capillaceous-multisect. Increased by divisions, or by seeds. The species described below will grow in any loamy, well-drained soil, which must be kept constantly moist.

H. Monniera (Monnier's). *fl.* pale blue, small, solitary, opposite, on long pedicels. Summer. *l.* cuneiform, entire, or toothed at the apex. Tropics. Stove. (B. M. 2557.)

H. reflexa (reflexed). A garden name for **Myriophyllum proserpinacoides** (which *see*).

HERRANIA (named in honour of General Herran, a President of the Republic of New Grenada). Ord. *Sterculiaceæ*. A genus comprising three or four species of greenhouse evergreen trees, with palm-like heads, natives of tropical America. Flowers fasciculate, growing directly from the trunk. Leaves digitate, five or six-foliolate. Few of the species are yet in cultivation. For culture, *see* **Sterculia.**

H. albiflora (white-flowered). *fl.* white, the thick concave petals terminated by a long strap-shaped appendage. *l.* palmate, clothed with rusty-coloured hairs. Shrub. The seeds of this plant are said to be mixed with those of the Cacao, and the product thereby improved.

HERRERIA (named in honour of Gabriel A. de Herrera, 1470-1539, a Spanish agriculturist). Ord. *Liliaceæ*. A genus comprising three or four species of pretty greenhouse plants. Flowers small, scented, in many-flowered axillary racemes. Leaves whorl-fascicled, linear-lanceolate. Stems climbing. Rootstock tuberous. Herrerias succeed in peat, sand, and loam, mixed. Increased by seeds, or by cuttings. Probably the only species in cultivation is the following:

H. Sarsaparilla (Sarsaparilla). *fl.* green, yellow; segments of perianth ovate-obtuse. June and July. *l.* lanceolate. *h.* 8ft. Brazil, 1824. (B. R. 1042, under name of *H. parviflora*.)

HESIODA. *See* **Heisteria.**

HESPERANTHA (from *hesperos*, the evening, and *anthos*, a flower). Evening Flower. Ord. *Irideæ*. A genus of about twenty species of rather pretty dwarf greenhouse bulbous plants, natives of tropical and Southern Africa. Flowers very sweetly scented, opening in the evening (whence the common name), in loose spikes; perianth salver-shaped; limb equalling the slender tube; segments equal, spreading. Leaves sword-shaped, curled. For culture, *see* **Ixia** (to which this genus is allied).

H. angusta (narrow). *fl.* uniform white. Spring. *l.* narrower than those of *H. falcata*.

H. cinnamomea (Cinnamon-scented). *fl.* whitish. April and May. *l.*, radical ones falcate, curled. *h.* 6in. 1787. (B. M. 1054.)

H. falcata (sickle-shaped). *fl.*, outer perianth segments shining brown outside; inner segments and inside of outer ones pure white. April. *l.* 3in. to 12in. long, striated, somewhat sickle-shaped. *h.* 6in. to 12in. (B. M. 566, under name of *Ixia falcata*.)

H. graminifolia (grass-leaved). *fl.* greenish-white. August and September. *l.* linear. Stem smooth. *h.* 6in. 1803. (B. M. 1254, under name of *H. pilosa nuda*.)

H. pilosa (pilose). *fl.* whitish; inner segments pure white; outer white within, specked with red outside. April and May. *l.* linear, hairy. Stem smooth. *h.* 6in. 1811. (B. M. 1475.)

H. radiata (rayed).* *fl.* white within, nodding; outer segments striped with reddish-brown. April to June. *l.* fistulous. *h.* 6in. 1794. (B. M. 573, under name of *Ixia radiata*.)

HESPERIS (the old Greek name used by Theophrastus, from *hesperos*, the evening; in reference to the flowers of most of the species being sweet-scented in the evening). Dame's Violet; Rocket. Ord. *Cruciferæ*. A genus comprising twenty species of pretty hardy or half-hardy biennial or perennial erect herbs, indigenous to Europe, Asia Minor, Persia, and Siberia. Flowers various-coloured, loosely racemose, ebracteate, sweet-scented. Leaves ovate or oblong, entire, dentate, or lyrate. Only a few of the twenty species constituting this genus are cultivated; and of these the double forms of *H. matronalis* are by far the best. They thrive in

Hesperis—*continued.*

a somewhat moist sandy loam. The single sorts may be increased freely by seeds; the double forms must be propagated by careful divisions of the roots, or by cuttings. The three species described below are hardy.

H. grandiflora (large-flowered).* *fl.*, racemes many-flowered, crowded. *l.*, radical ones oblong-ovate, obtuse; cauline ones lanceolate. Native country unknown. (B. M. 2683.)

H. matronalis (matronly).* Damask Violet; Dame's Rocket; Dame's Violet; Common Rocket. *fl.* various, usually sweet-scented in the evening. Summer. *l.* shortly stalked or tapering at the base, ovate-lanceolate or lanceolate. *h.* 2ft. to 3ft. South Europe and all across Russian Asia. (Sy. En. B. 103.) There are numerous double and single varieties of this handsome perennial, all of which are very ornamental border plants.

H. tristis (sad).* Night-scented Stock. *fl.* whitish or cream-coloured, or brownish-red or dark purple, fragrant at night; pedicels very long. Spring and summer. *l.*, radical ones stalked, upper ones sessile, ovate, acute, entire or toothed, 2in. to 4in. long. Stem much branched at the top. *h.* 1ft. to 2ft. Eastern Europe, &c., 1629. Biennial. This should be grown on old walls, ruins, and such like places, where the seeds may be sown in crevices, &c. (B. M. 730.)

HESPEROSCORDON LACTEUM. A synonym of **Brodiæa lactea** (which *see*).

HESSEA (so called in honour of Paul Hesse, a botanical traveller). Including *Imhofia.* SYN. *Periphanes.* ORD. *Amaryllideæ.* A genus comprising about four or five species of greenhouse bulbs, from the Cape of Good Hope. Umbels many-flowered; scape solid. Leaves linear or subulate. For culture, *see* **Strumaria.**

H. crispa (curled).* *fl.* pink; umbels many-flowered; perianth segments wavy, flat. April to August. *l.* filiform, straight. *h.* 3in. 1790. (B. M. 1363, under name of *Strumaria crispa.*)

H. filifolia (thread-leaved). *fl.* white; perianth segments acute. November. *l.* filiform. *h.* 6in. 1774. SYN. *Imhofia filifolia.* (B. R. 440, under name of *Strumaria filifolia.*)

H. gemmata (twin). *fl.* pale yellow; perianth segments wavy, channelled; peduncles very long; scape flexuose. August. *l.* lanceolate, ciliate. *h.* 1ft. 1812. (B. M. 1620, under name of *Strumaria gemmata.*)

H. stellaris (starry). *fl.* pink; perianth segments spreading alternately, bearding beneath the ends. October and November. *l.* linear-acute, entire. *h.* 6in. 1794. SYNS. *Amaryllis stellaris, Strumaria stellaris.*

HETERANTHERA (from *heteros*, variable, and *anther*; the anthers are variable). ORD. *Pontederaceæ.* A genus containing about eight species of ornamental aquatic perennial herbs, one of which is tropical African, and all the rest American. Flowers blue or white, small, produced from a spathe in the axil of a sheathing leaf-stalk; perianth salver-shaped, with a long, slender tube, and a spreading, six-lobed limb. Leaves roundish, long-stalked or linear. *H. limosa* may be grown by the sides of a pond or rivulet. The remainder require the same treatment as other tender aquatics.

H. limosa (bog).* *fl.*, perianth tube slender; limb bright violet-blue; segments linear-oblong, obtuse; peduncles one-flowered. From May onwards. *l.* erect, from orbicular-ovate to almost lanceolate, obtuse, pale bright green on both surfaces, striated with numerous veins; petiole 6in. to 10in. long, stout, fistular. America (in bogs and marshes), widely distributed. Half-hardy. (B. M. 6192.)

H. reniformis (kidney-shaped). Mud Plantain. *fl.* white. July. *l.* roundish, kidney-shaped. South America, 1824. Greenhouse.

HETEROCENTRON. A synonym of **Heeria** (which *see*).

HETEROCHÆTA. Now included under *Aster* and *Erigeron.*

HETEROGAMOUS. When, in a flower-head, the florets of the ray are either neuter or female, and those of the disk male.

HETEROLOMA. *See* **Desmodium.**

HETEROMELES ARBUTIFOLIA. A synonym of **Photinia arbutifolia** (which *see*).

HETERONOMA. A synonym of **Arthrostemma** (which *see*).

HETEROPAPPUS (from *heteros*, dissimilar, and *pappos*, down; in reference to the pappus of the ray and

Heteropappus—*continued.*

disk florets being different). ORD. *Compositæ.* A genus comprising about four species of erect hardy herbs, natives of Japan, Formosa, or Mandschuria; closely allied to *Aster.* Flower-heads rather large or medium, loosely and irregularly panicled, or solitary at the apices of the branches; corolla rays white or bluish. Leaves alternate, entire or largely dentate. For culture, *see* **Aster.**

H. decipiens (deceptive). *fl.-heads* large; ray purple, disk yellow. Autumn. *l.* oblong-linear, acute. Mandschuria, 1863. (R. G. 425.)

H. hispidus (hairy).* *fl.-heads* white; scales of the involucre oblong-imbricated. September. *l.* oblong-lanceolate, scabrous, ciliated; lower ones ovate. Stem hispid; branches one-headed. *h.* 1ft. China and Japan, 1804. SYN. *Aster hispidus.*

HETEROPTERYS (from *heteros*, various, and *pteron*, a wing; in allusion to the various forms of the winged samaræ). ORD. *Malpighiaceæ.* A genus comprising about eighty species of ornamental stove shrubs, rarely climbing, natives of tropical, or rarely extra-tropical, South America, and a few Western tropical African. Flowers small, very often paniculate or racemose. Leaves opposite, and, for the most part, entire, usually glandular beneath; petioles short; stipules inconspicuous. The two species described below are stove climbers, closely allied to **Banisteria** (which *see* for cultivation).

H. chrysophylla (golden-leaved). *fl.*, corolla orange-coloured, becoming deeper and almost red in age; peduncles axillary, bearing an umbellate panicle. March. *l.* opposite, oval or oval-oblong, entire, somewhat acute and waved, coriaceous, dark green and glabrous above, and clothed with a golden-brown satiny pubescence beneath. Brazil, 1833. (B. M. 3237.)

H. purpurea (purple). *fl.* purple; racemes axillary and terminal, few-flowered. *l.* oval, smooth, glaucous beneath. Tropical America, 1759.

HETEROS. This, in Greek compounds, signifies variable, various.

HETEROSPATHE (from *heteros*, variable, and *spathe*, a spathe; alluding to the inequality in the size of the spathes). ORD. *Palmeæ.* A monotypic genus, the species being an elegant stove palm, with a graceful spreading habit, and remarkable for the length of the tapered segments of its pinnate fronds. It thrives in rich sandy loam and leaf mould, and may be increased by imported seeds.

H. elata (tall).* *l.* pinnatisect; leaflets ½in. broad, with somewhat wider intervals between them, bright green on both surfaces, narrowing upwards into a long, slender, tapering point. Stems smooth. Amboyna, 1880. SYN. *Metroxylon elatum*, of gardens.

HETEROTHECA (from *heteros*, variable, and *theca*, a sheath; in reference to the shape of the achenes). SYNS. *Calycium* and *Diplocoma.* ORD. *Compositæ.* A genus of hairy or glabrous, erect, hardy or half-hardy herbs. Seven species have been enumerated (which may probably be reduced to about five), natives of North America and Mexico. *H. inuloides*—probably the only one in cultivation—is a pretty plant, adapted for culture in ordinary garden soil, but requires protection in winter. Propagated by seeds, or by divisions.

H. inuloides (Inula-like). *fl.* yellow, large; involucre many-leaved, closely imbricate, villosely hairy; receptacle honey-combed; corymbs loosely spreading, branched; peduncles very hairy. Summer. *l.* ovate-oblong, entire, hairy on both sides and fringed at the margins; root ones ovate, obtuse, bluntly toothed; stem ones sessile, somewhat amplexicaul, variable in shape. Stems 1ft. to 1½ft. high. Mexico, 1826. (S. B. F. G. 246, under name of *Diplocoma villosa.*)

HETEROTOMA (from *heteros*, variable, and *tome*, a cut; corolla unequally cut). ORD. *Campanulaceæ.* A genus containing four species of annual or perennial herbs, natives of Mexico. Flowers pedunculate, in terminal racemes; corolla blue or golden. Leaves alternate, petiolate. The species here described—perhaps the only one yet in general cultivation—is a very ornamental greenhouse or half-hardy plant. For culture, *see* half-hardy species of **Lobelia.**

Heterotoma—*continued.*

H. lobelioides (Lobelia-like).* Bird Plant. *fl.* purplish and yellow, racemose; corolla very curious, somewhat tubular, with a tapering base. *l.* broadly ovate, with distant teeth. Stem becoming woody at the base. Mexico, 1861. (F. d. S. 1454.)

HETEROTRICHUM. A synonym of **Saussurea** (which *see*).

HETEROTROPA (from *heteros*, various, and *trope*, a change; in allusion to the variable nature of the plants). ORD. *Aristolochiaceæ*. A small genus of greenhouse or half-hardy perennial herbs, with creeping roots, natives of Japan; now included, by Bentham and Hooker, under *Asarum*. Flowers terminal, solitary, shortly pedunculate; perianth dusky-purple or lurid; lobes acute or caudate-acuminate. Leaves long, petiolate, cordate-reniform or almost hastate. For culture, &c., *see* **Asarum.**

H. asaroides (Asarum-like). *fl.* inclined or drooping, on very short peduncles; perianth dull purplish-green, depresso-globose, contracted at base and mouth; limb of three triangular blunt segments, spreading horizontally; internal surface deeply cellular. April and May. *l.* petiolate, deeply cordate, nearly ovate, entire, spotted; petioles erect, as long as the leaves. Rhizome branched and nodose. *h.* 6in. 1836. Plant glabrous. Greenhouse. SYN. *Asarum japonicum.* (B. M. 4933.)

H. parviflora (small-flowered). *fl.* purple and green, solitary, bracteated, about half the size of those of *H. asaroides*; perianth urceolate; tube constricted above the middle, oval-ventricose below; segments of limb broadly ovate; bracts longer than the flowers. April. *l.* solitary, cordate, white-spotted, with a deep, narrow sinus. *h.* 3in. 1862. Greenhouse. (B. M. 5380.)

HEUCHERA (named after Johann Heinrich Heucher, 1677-1747, Professor of Medicine at Wittenburg). Alum Root. ORD. *Saxifrageæ*. This genus comprises about twenty species of elegant hardy perennial herbs, natives of temperate North America, from Mexico almost to the Arctic regions. Flowers rather small, spicate, racemose or paniculate, bracteate, glabrous or pubescent. Leaves radical, long-petiolate, broadly cordate or orbiculate, lobed or crenate. All the species are of easy culture in any ordinary garden soil, except stiff clay, and may be readily increased by dividing the crowns during spring. Most of the Heucheras have inconspicuous flowers, but *H. sanguinea* is one of the handsomest of recently-introduced herbaceous plants. All are worth growing on account of their foliage, but a couple of species will be sufficiently representative of the general character of the genus.

H. americana (American).* *fl.* reddish; thyrse elongated, panicled. Summer. *l.* on long petioles, somewhat five to seven-lobed, toothed. *h.* 1½ft. North America, 1656. Plant clothed with clammy pubescence.

H. caulescens (caulescent). A synonym of *H. villosa.*

H. cylindrica (cylindrical). *fl.* greenish, rather large; panicle compact, cylindrical. Summer. *l.* cordate, deeply and roundly lobed, crenated, ciliated, truncate at the base. *h.* 1ft. to 1½ft. Oregon, &c., 1830. (B. R. 1924.)

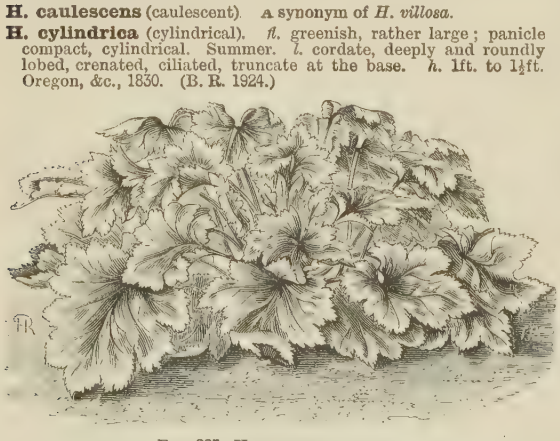


FIG. 223. HEUCHERA GLABRA.

H. glabra (glabrous). *fl.* white, small; panicle loose. Summer. *l.* cordate, acutely lobed, glabrous, unequally and acutely toothed; lower stem ones or bracts toothed. *h.* 1ft. North-west America, 1827. See Fig. 223. (H. F. B. A. i. 79.)

Heuchera—*continued.*

H. hispida (hispid).* *fl.* veined with purple, more or less oblique; stamens soon exserted, longer than the spathulate petals; panicles very narrow; scapes 2ft. to 4ft. high. May to July. *l.* rounded, slightly five to nine-lobed. High mountains of Virginia and Carolina, 1826. Plant hispid or hirsute, with long spreading hairs (occasionally almost glabrous), scarcely glandular. SYN. *H. Richardsonii.*

H. Menziesii (Menzies'). A synonym of *Tolmiea Menziesii.*

H. micrantha (small-flowered). *fl.* yellowish; panicle loose. Summer. *l.* roundish-cordate, nearly naked, bluntly lobed, crenate; teeth horned. *h.* 2ft. North-west America, 1827. (B. R. 1302.)

H. pubescens (downy). *fl.* pale red, variegated with yellow, large; branches of panicle short, crowded with flowers. Summer. *l.* somewhat acutely lobed, toothed; teeth mucronate. *h.* 1ft. United States, 1812. Plant covered with powdery down. SYNS. *H. pulverulenta, H. ribifolia.*

H. pulverulenta (powdery). A synonym of *H. pubescens.*

H. ribifolia (Currant-leaved). A synonym of *H. pubescens.*

H. Richardsonii (Richardson's). A synonym of *H. hispida.*

H. sanguinea (blood-coloured).* *fl.* deep red, paniculate, somewhat campanulate. Summer. *l.* cordate, orbiculate, five to seven-lobed; lobes dentate, ciliate; petioles clothed with spreading hairs. *h.* 9in. to 18in. Northern Mexico, 1882. (Gn. xxvi. 360.)

H. villosa (villous). *fl.* violet, small, loosely panicled; petals spathulate-linear, about as long as the stamens, soon twisted; scapes 1ft. to 3ft. high, villous, with rusty hairs (as are also the petioles and veins of the leaves beneath). August and September. *l.* acutely seven to nine-lobed. United States and Canada, 1812. SYN. *H. caulescens.*

HEVEA (from *Hevé*, a vernacular name in Northern South America). SYNS. *Micrandra, Siphonia.* ORD. *Euphorbiaceæ*. A genus comprising nine species of tall stove trees, natives of the damp forests of tropical America. Flowers in dichotomous cymes. Leaves alternate, on long petioles, digitately five-foliolate; leaflets petiolulate, entire. Of the two or three species yet introduced, the best-known is the one here described. It succeeds in a sandy loam. Propagated by cuttings, made of half-ripened wood, and inserted in sand, under a hand glass, in heat.

H. braziliensis (Brazilian). *fl.* green, white. May. *l.* light green, digitately trifoliolate. *h.* 60ft. Tropical South America, 1823. This plant furnishes the well-known Para rubber of commerce.

HEWARDIA. Now included under *Adiantum.*

HEXACENTRIS. This genus is now included, by the authors of the "Genera Plantarum," under **Thunbergia** (which *see*).

HEXAGLOTTIS (from *hex*, six, and *glotta*, a tongue; in reference to the six spreading lobes of the style). ORD. *Irideæ*. A genus of two or three species of pretty greenhouse bulbous plants, from South Africa, rarely seen in cultivation. For culture, *see* **Ixia.**

H. longifolia (long-leaved). *fl.* yellow; segments nearly equal, oblong, spreading; filaments united in a cylinder. May. *h.* 1½ft. 1766. SYNS. *Homeria* and *Morœa flexuosa.* (B. M. 695, under name of *Morœa flexuosa.*)

H. virgata (twiggy). *fl.* yellow. May. *h.* 2ft. 1825.

HEXAGONAL. Six-sided.

HIBBERTIA (named after George Hibbert, a distinguished patron of botany, who died in 1838). Including *Cyclandra, Hemistemma,* and *Pleurandra.* ORD. *Dilleniaceæ*. A genus of about seventy species of stove or greenhouse shrubs or under-shrubs, of which two are from Madagascar, three or four from New Caledonia, and the rest from Australia. Flowers yellow or white, solitary and terminal, or apparently axillary, sessile, in a tuft of floral leaves, or pedunculate. Leaves entire, or rarely largely or remotely dentate, often Heath-like, one-nerved or obscurely reticulate, penniveined. Hibbertias grow freely in peat or loam, either together or separate; a sufficient quantity of sand must, however, at all times be added, to maintain the soil in a healthy, porous condition. The pruning of weak and straggling shoots will need attention. If insects appear, they must be eradicated at once, or they will soon cause the plants to become both unhealthy and unsightly. Propagation may

Hibbertia—*continued.*

be effected by cuttings, inserted in sandy peat, under a bell glass. The commonest and most useful species is *H. dentata*. The undermentioned species require greenhouse treatment, except where otherwise stated.

H. Baudouinii (Baudouin's). *fl.* secund, sub-sessile, 2in. in diameter; sepals green, oblong, concave, apiculate; petals bright yellow, obovate-cuneate, retuse; racemes axillary, equalling the leaves, stout, sub-recurved. Summer. *l.* crowded towards the ends of the branches, 1ft. long, sessile, narrow-lanceolate, acuminate, entire or minutely serrulate. Stem grooved. New Caledonia. A small stove shrub. (B. M. 6053.)

H. crenata (crenate). A synonym of *H. grossulariæfolia.*

H. Cunninghamii (Cunningham's). *fl.* yellow; sepals thin, broadly ovate, the outer ones more acute; petals slightly notched; peduncles axillary. July. *l.* linear, mostly pointed; the edges scarcely recurved, narrowed below the middle, but expanded again into a stem-clasping or sagittate base. Branches slender. Western Australia, 1832. (B. M. 3183.)

FIG. 224. FLOWERING BRANCH OF HIBBERTIA PERFOLIATA.

H. dentata (toothed).* *fl.* dark yellow, 1½in. to 2in. in diameter, solitary, axillary. Spring and summer. *l.* oblong, acuminated, smooth, serrated, awned. 1814. Climber. (B. M. 2338.)

H. grossulariæfolia (Gooseberry-leaved). *fl.* yellow, rather small, on filiform peduncles; sepals ovate or lanceolate, acuminate; petals obovate, entire, or nearly so. May. *l.* distinctly petiolate, ovate or oval-oblong, obtuse, undulate and coarsely toothed, prominently pinnate, veined underneath, glabrous or scabrous above, more or less pubescent or hairy beneath. Stems weak and prostrate, or trailing, loosely pubescent. Western Australia, 1816. SYNS. *H. crenata* (A. B. R. 472; B. M. 1218), *H. latifolia.*

H. latifolia (broad-leaved). A synonym of *H. grossulariæfolia.*

Hibbertia—*continued.*

H. pedunculata (pedunculate). *fl.*, sepals ovate, very obtuse, usually minutely pubescent outside; petals obovate, slightly emarginate. *l.* narrow-linear, rigid, obtuse; margins revolute, numerous, but not clustered. Stems diffuse, prostrate, or rarely erect. New South Wales. There is a variety, *corifolia*, figured in B. M. 2672.

H. perfoliata (perfoliate).* *fl.* pale yellow. Summer. *l.* ovate, acute, edged with minute distant teeth, perfoliate near the base. Stem shortly trailing, procumbent or erect. West Australia. See Fig. 224. (B. R. 1843, 64.)

H. stricta (upright).* *fl.* bright yellow, small, profusely produced, solitary, axillary, and terminal. *l.* linear. Australia. A wiry and much-branching species. There are several forms.

H. volubilis (twining). *fl.* rather fœtid, sessile, the largest of the genus. Summer. *l.* obovate-lanceolate, nearly entire, mucronate, 3in. to 4in. long. Stems twining. Queensland and New South Wales, 1790. (A. B. R. 126.)

HIBISCUS (the old Greek name for the Marsh Mallow, used by Dioscorides). Including *Lagunæa*, *Paritium*, and *Trionum*. ORD. *Malvaceæ*. An extensive genus, comprising about 150 species of stove, greenhouse,

FIG. 225. FLOWERING BRANCH OF HIBISCUS COCCINEUS.

Hibiscus—*continued.*

or hardy herbs, shrubs, or trees, natives, for the most part, of tropical regions, but occurring also in temperate ones. Flowers variable in colour, and usually showy. Leaves variable, often partite.

Cultivation. Stove or warm greenhouse species of Hibiscus succeed best either in large pots or when planted out. A compost of peat and fibry loam, not broken too finely, in about equal proportions, with the addition of a little charcoal or sand, will suit them admirably. Those grown for their flowers should be rested, and kept tolerably dry, throughout the winter. In spring, they require a little cutting in, and starting in a brisk, moist heat; afterwards applying plenty of heat and water throughout the summer. Some of the species, which succeed in a greenhouse all the summer, will require warmer quarters in winter. They are propagated from seed, and by cuttings, inserted in a close frame, in spring. *H. r.-s. Cooperi* is a free-growing plant, with ornamental foliage, requiring the same treatment in winter as other stove subjects. The hardy species succeed in ordinary garden soil, preferably in that which is sandy, and in a warm position. *H. Trionum* may be readily increased from seeds.

H. africanus (African). A synonym of *H. Trionum.*

H. Cameroni (Cameron's). *fl.* rosy; calyx large, inflated, five-lobed; petals obliquely cuneate-truncate, with a crimson blotch at the base of each. June and July. *l.* cordate, five-lobed, coarsely serrated; lobes acute, constricted at base. *h.* 1ft. Madagascar, 1837. Stove shrub. (B. M. 3936.)

H. coccineus (scarlet).* *fl.* bright scarlet. July and August. *l.* long-stalked, five-parted; lobes lanceolate, remotely toothed, with entire tips. *h.* 4ft. to 8ft. Marshes of Florida and Georgia. Greenhouse perennial. See Fig. 225. (B. M. 360, under name of *H. speciosus.*)

H. elatus (tall). *fl.* purplish-copper colour, large; peduncles very short, one-flowered; involucre ten-cleft. *l.* roundish-cordate, quite entire, downy-white beneath. *h.* 50ft. West Indies, 1790. Stove. "Cuba Bast" is formed from the inner bark of this tree. SYN. *Paratium elatum.*

H. ferox (fierce). *fl.* yellow; calyx pentagonal, hispid, inflated in front; peduncles axillary, twin, one-flowered. May to July. *l.* large, shining, cordate, five to seven-lobed, villous beneath; stipules cordate, acuminate. *h.* 3ft. New Grenada, 1844. A prickly stove shrub. (B. M. 4401.)

H. Huegelii quinquevulnerus (Baron Huegel's five-spotted). A very handsome variety, with deep rose petals, paler below, and each petal having a black blood-coloured spot on the claw. August. Swan River, 1853. Greenhouse.

H. marmoratus (marbled).* *fl.* 2½in. long, and as wide across the petals; peduncles solitary, axillary, stiff, much longer than the petioles, articulate above the middle; calyx tubular-campanulate, five-cleft almost to the middle; petals white, reticulately mottled with bright rose-pink, longer than the calyx, convolute into a tube below, spreading above; staminal column slender, exserted. February. *l.* on rather short petioles, variable in shape, bluntly toothed, dark green on the upper surface, paler below, 3in. to 4in. long, 2in. to 4in. broad. Mexico, 1854. Greenhouse shrub. (B. M. 5702.)

H. militaris (military).* *fl.* rose-coloured; pedicels axillary, free from the petioles, one-flowered, and jointed above the middle. Summer. *l.* cordate, toothed, somewhat three-lobed, downy beneath. *h.* 2ft. to 4ft. United States. Hardy perennial. (B. M. 2385.)

H. Moscheutos (Moscheutos). *fl.* white, with a purplish centre, or sometimes pale purple, large; petioles and peduncles joined together; involucres and calyces downy. Summer. *l.* ovate, acuminated, serrated, downy beneath. *h.* 3ft. North America. Hardy. (S. B. F. G. 286.)

H. pedunculatus (pedunculate). *fl.* deep rosy-red, showy, campanulate; petals cuneate-oblong, rounded at the apex; involucre of about eight linear segments. *l.* three-lobed, the lobes blunt, with toothed margins. Stems hairy. Natal. *h.* 2ft. to 4ft. Greenhouse shrub. (B. R. 231.)

H. radiatus (rayed). *fl.* axillary, solitary, short-peduncled, very large; the exterior two-thirds of the petals yellow, and spreading horizontally; the inner third deep crimson, and formed into a bell. Summer. *l.* alternate, palmate, rarely simple; petioles armed, and nearly as long as the leaves. Branches armed with small prickles. India and Java. Stove shrub. *H. r. flore-purpureo* is a variety having fine rose-purple flowers. (B. M. 5098.) *H. Lindlei* (B. R. 1395), another with deep purple corollas.

H. rosa-sinensis (Chinese Rose).* *fl.* varied in colouration, large, single, semi or wholly double; pedicels length of leaves; involucre seven-leaved. Summer. *l.* ovate, acuminated, smooth, entire at the base, but coarsely toothed at the apex. Stem unarmed, arboreous. *h.* 10ft. to 15ft. China, Japan, &c., 1731;

Hibiscus—*continued.*

FIG. 226. FLOWERING BRANCH OF HIBISCUS ROSA-SINENSIS.

cultivated for ornament throughout all tropical regions. Stove. See Fig. 226. Of the numerous varieties in cultivation, the following are the most noteworthy and desirable.

H. r.-s. brilliantissimum (very brilliant). *fl.* 5½in. across, spreading, almost flat, but having a short funnel-shaped base, formed by the convergence of the bases of the petals, which are in that part stained with a deeper crimson, and overlapping each other so that they form a circular flower.

H. r.-s. Calleri (Caller's). *fl.* buff-yellow, with a crimson-scarlet base. A very distinct and remarkable variety, with general character and habit of type.

H. r.-s. Cooperi (Cooper's).* *fl.* scarlet. *l.* irregularly ovate-lanceolate, cuneate at the base, bluntly serrated, vivid green, splashed and blotched with dark olive-green, creamy-white, and crimson, and margined with a broad and irregularly feathery border of reddish-carmine.

H. r.-s. fulgidus (shining).* *fl.* 5in. in diameter, of fine broad, rounded, and beautifully undulated petals, of an intense carmine-scarlet, paler and somewhat rosy tinted towards the base, where on each petal is an oblong blotch of deep crimson. *l.* broadly-ovate, serrated.

FIG. 227. FLOWERING BRANCH OF HIBISCUS ROSEUS.

Hibiscus—*continued.*

H. r.-s. miniatus semi-plenus (half-double vermilion). *fl.* vermilion-scarlet, semi-double; petals very much waved and recurved, forming an irregular undulated mass 4in. across. *l.* leathery, ovate, coarsely toothed.

H. r.-s. vivicans (lively). *fl.* brilliant crimson-scarlet, 4in. to 5in. in diameter, the centre being completely filled up with broad, convolute petaloid processes.

H. r.-s. zebrinus (zebra-striped). *fl.* about 3½in. in diameter, and 2½in. deep, double; the five outer petals scarlet, edged with creamy-yellow in the lower part; staminal column entirely petaloid, with numerous irregular tufts at the apex, of a creamy-yellow colour, variously and irregularly striped and flaked with scarlet. The flowers are very irregular and grotesque in form.

H. roseus (rosy). *fl.* rose-coloured, large, axillary, solitary. *l.* large, broadly oval-acuminate, covered with white tomentum beneath. *h.* 3ft. Naturalised in marshy spots in France and elsewhere. Probably of New World origin. Hardy. See Fig. 227.

H. schizopetalus (cut-petaled).* *fl.* brilliant orange-red, pendulous, on slender peduncles; petals deeply cut or laciniated; the united filaments of the stamens closely surround the style, and the latter projects about 2in. beyond the corolla. A remarkable stove species. (B. M. 6524.)

H. speciosus (showy). A synonym of *H. coccineus.*

H. splendens (splendid). *fl.* rose-coloured, very large; pedicels as long as the petioles; calyx 1in. long, deeply divided, densely tomentose or hispid. May. *l.* on long petioles, broadly ovate-cordate, or palmately three or five-lobed, often 6in. or 7in. long; lobes oblong-acuminate or lanceolate, often narrowed at base. *h.* 12ft. to 20ft. Australia, 1828. A beautiful, densely tomentose greenhouse shrub; branches and petioles bristly or prickly. (B. M. 3025; B. R. 1629.)

FIG. 228. FLOWERING BRANCH OF HIBISCUS SYRIACUS.

H. syriacus (Syrian).* *fl.* varying much in colouration, large, single or double; pedicels hardly longer than the leaves; involucre six or seven-leaved. August. *l.* alternate, ovate, wedge-shaped, three-lobed, toothed. *h.* 6ft. Syria, 1596. Hardy deciduous shrub. See Fig. 228. SYN. *Althæa frutex.* The following are the most approved varieties: ALBO-LUTEOLUS PLENUS, ALBO-PLENUS, AMARANTHUS, AMPLISSIMUS, ANEMONÆFLORUS, ARDENS, BICOLOR HYBRIDUS, CARNEO-PLENUS, CŒLESTIS, CŒRULEUS PLENUS, DUC DE BRABANT, DUCHESSE DE BRABANT, ELEGANTISSIMUS, FASTUOSUS, LEOPOLDII, MONSTROSUS, POMPON ROUGE, PUNICEUS PLENUS PURPUREUS VARIEGATUS, RANUNCULIFLORUS, ROSEUS PLENUS, RUBRUS PLENUS, SPECIOSUS RUBRUS, TOTUS ALBUS, VIOLACEUS ATROPURPUREUS FLORE-PLENISSIMO, VIOLACEUS VARIEGATUS, VIOLET CLAIR (double).

H. Trionum (Trionum). Bladder Ketmia. *fl.* yellow, with a purple centre. Summer. *l.* cordate, palmately lobed; lobes linear. *h.* 2ft. Africa. Hardy annual. See Fig. 229. SYN. *H. africanus.*

Hibiscus—*continued.*

FIG. 229. FLOWERING BRANCH OF HIBISCUS TRIONUM.

Varieties. The varieties of *H. rosa-sinensis* and *H. syriacus* are very beautiful, especially those of the former. For this reason, only a few of the typical species are seen in our gardens, and these are much inferior to the varieties.

HICKORY. *See* **Carya.**

HIERACIUM (the Greek name used by Dioscorides for another plant, from *hierax*, a hawk; application doubtful). Hawkweed. ORD. *Compositæ.* A genus, comprising about 150 species of hardy perennial herbs, from Europe, North Asia, and a few from America, very nearly allied to *Crepis.* Flower-heads yellow, or rarely orange-red; involucre more or less imbricated. Leaves entire or toothed. Comparatively few of the species of this extensive genus are worth growing. These are of very easy culture in any ordinary garden soil. Some of the British ones do well on old walls, and in such positions are very ornamental. Propagated by divisions, in spring; or by seeds.

H. aurantiacum (orange).* *fl.-heads* orange-red; corymb eight to ten-flowered; involucre covered with long hairs. June and July. *l.* elliptical, acute, entire. Stem often bearing one or two leaves at the bottom, hairy. *h.* 1ft. to 1½ft. Scandinavia to the Pyrenees (naturalised in North of England and Scotland). (Sy. En. B. 823.)

H. Pilosella (mouse-ear). *fl.-heads* lemon-coloured, often tinged with red on the outside; involucres and upper part of peduncle more or less clothed with minute and close whitish down, mixed with short, stiff, spreading black hairs. *l.* oblong or lanceolate, entire, tapering at the base, and often stalked. Europe (Britain), North and West Asia, North Africa. (Sy. En. B. 822.)

HIEROCHLOE (from *hieros*, sacred, and *chloa*, grass; in the North of Europe, these grasses are strewn before church doors, on saints' days). Holy Grass. SYNS. *Disarrenum, Savastana, Torresia.* ORD. *Gramineæ.* A genus of about eight species of sweet-scented hardy perennial grasses, inhabiting the colder regions of both Northern and Southern hemispheres. Spikelets three-flowered, open-panicled; flowers all with two paleas; glumes equalling or exceeding the spikelet, scarious. Hierochloes grow freely in damp spots, in any ordinary garden soil. Propagated by seeds, which are abundantly produced.

H. alpina (alpine). *fl.*, panicle contracted, 1in. to 2in. long; one of the staminate flowers barely pointed, or short-awned near the tip, the other long-awned from below the middle. July. *l.*, lower ones very narrow. *h.* 1ft. Northern hemisphere (on alpine mountain tops), 1827.

H. borealis (Northern). *fl.*, spikelets chestnut-colour; staminate flowers strongly hairy-fringed on the margins, with the lower palea mucronate or bristle-pointed at or near the tip; panicle somewhat one-sided, pyramidal, 2in. to 5in. long; peduncles smooth. May. *l.* short, lanceolate. Culm 1ft. to 2ft. high. Rootstock creeping. Northern hemisphere (Caithness).

HIGGINSIA. A synonym of **Hoffmannia** (which *see*).

HILLIA (named after Sir John Hill, 1716-1775, a celebrated botanical author). SYNS. *Fereiria, Saldanha.* ORD. *Rubiaceæ.* A genus comprising about five species of ornamental stove evergreen shrubs, natives of tropical America and the West Indian Islands. Flowers white, large, terminal, solitary, sub-sessile, bracteate and bracteolate. Leaves opposite, shortly petiolate, fleshy; stipules intrapetiolar, membranaceous, caducous. For culture, *see* **Cinchona.**

H. longiflora (long-flowered). *fl.* white, very fragrant; tube long; corolla with six twisted segments. February. *l.* ovate. *h.* 2ft. West Indies, &c., 1789. (B. M. 721.) *H. tetrandra* is an allied species.

HILUM. The scar produced by the separation of a seed from its placenta.

HINDSIA (named after R. Brinsley Hinds, the botanist of the "Sulphur" Expedition). SYN. *Macrosiphon.* ORD. *Rubiaceæ.* A genus comprising about three species of small ornamental stove evergreen shrubs, natives of Brazil. Flowers violaceous, rather large, in terminal cymes, sessile; pedicels short, bracteolate. Leaves petiolate, ovate, or ovate-lanceolate. For culture, *see* **Rondeletia.**

H. longiflora (long-flowered). *fl.* blue; panicle leafy, branches three-flowered. May. *l.* ovate-lanceolate, strigose beneath. *h.* 2ft. 1841. (B. M. 3977, under name of *Rondeletia longiflora.*) There is a white-flowered form.

H. violacea (violet).* *fl.* elegant ultramarine, disposed in clusters 2in. long. May. *l.* broad-ovate. *h.* 3ft. 1844. Plant downy. (B. M. 4135.)

HIPPEASTRUM (from *hippeus*, a knight, and *astron*, a star; referring to the shape of *H. equestre*). Equestrian Star. ORD. *Amaryllideæ.* A genus of upwards of fifty species of tunicated bulbous plants, natives

FIG. 230. HYBRID HIPPEASTRUMS.

of tropical and extra-tropical South America. Perianth funnel-shaped, more or less declinate; scape fistulose, two or many-flowered. In most catalogues, the plants described below are classed under *Amaryllis.* Few subjects are more gorgeous and attractive, in winter

Hippeastrum—*continued.*

and spring, than several of the species of *Hippeastrum*, and the numerous beautiful hybrids (see Fig. 230) that have been obtained therefrom by the skill and persevering labours of the hybridist. Some of the flowers are of the richest deep crimson and blood-red; others are nearly white, or are striped, mottled, and blended, in a most effective manner, with a combination of colours. Distinct species and hybrids have been crossed and intercrossed, until breadth of petal, size, substance, and perfect form of flowers, have been attained far beyond the most sanguine expectations of the hybridisers themselves. When once established, and of sufficient size, the flowering of the bulbs annually is almost certain; they do not require much space, and their general culture is easy. Propagation is readily effected by seeds for raising new varieties, and this method is also largely practised for producing bulbs to flower for ordinary decoration. Named species or varieties are perpetuated by offsets, which spring up from the base of established bulbs.

Seeds should be sown, as soon as ripe, in well-drained pots or pans of sandy loam, slightly covered, and placed in a temperature of about 65deg. When the seedlings are large enough to handle, pot off into very small pots, taking care not to insert too deeply, and afterwards plunge in bottom heat. If kept in a moist atmosphere, with a temperature ranging from 60deg. to 70deg., the young plants make rapid progress.

Offsets. For increasing by offsets, it is necessary to take the old bulbs from the pots, and carefully separate with the least possible injury to the roots. The latter become much interlaced, and do not like disturbance; consequently, it should not be resorted to more than is requisite. It is best to leave them until several offsets are formed, as the latter increase in size faster when attached to the parent plant, and the necessity of frequently disturbing the roots is avoided. The operation should be performed when the plants are at rest. Offsets should be placed singly in pots, but must on no account be overpotted, as they do not succeed in a quantity of soil, which is liable to become soured before being penetrated with roots. Keep the bulb about two-thirds above the level of the soil, dispose the roots evenly, and afterwards plunge in bottom heat, in a position exposed to light.

Cultivation. Hippeastrums are more or less evergreen, and, although they require a season of rest, water should never be entirely withheld. The growing season is from early spring, after flowering is over, until about September, when the plants should be kept cool and allowed to rest until February. They may then be placed in a minimum temperature of about 60deg., and more water and syringings applied. If the bulbs are large enough, and have been well matured, the flower scapes will soon appear, usually a little in advance of the leaves. Young bulbs should be repotted, if they require it, just when starting, shaking out some of the old soil, well filling in the new amongst the roots, and making it quite firm with a hand rammer. Established flowering bulbs in 7in., or larger pots in the case of extra-sized specimens, should have a top-dressing each year when starting; this being generally sufficient for them, with the aid of manure water in the growing season. Rather heavy, loamy soil should be used, with the addition of some charcoal and crushed bones, and good drainage is very important. Hippeastrums require plenty of light and sunshine, except during the flowering period, when a light shading will tend to preserve the blossoms. In some large nurseries, special houses are now devoted to their accommodation. They are made with a span-roof, thus insuring plenty of light. The pots are plunged level in beds of tan or cocoanut fibre, and a magnificent display is made by the plants when

Hippeastrum—*continued.*

flowering in a mass about the month of April. Plenty of air and water may be administered in summer, taking care to get them thoroughly ripened by autumn, when the pots, with their contents, may be stored and kept in a moderately dry, cool house until starting time the following year.

H. Ackermanni (Ackermann's).* *fl.* crimson, handsome, very large. Stove. The parent of many of the large-flowering varieties. One of the best of these is *pulcherrima*, which has a deep crimson throat, very handsomely streaked with green.

H. Alberti (Albert's). *fl.* orange-red, yellowish towards the base of each petal, full double, about 6in. across. Cuba, 1867. A very handsome variety, probably merely a double form of *H. equestre*. Stove. (I. H. 1866, 498.)

H. ambiguum (ambiguous). *fl.*, perianth tubulose; segments striated with red within; throat softly bearded. *l.* broad, strap-shaped, full green. *h.* 2ft. Lima, 1836. A very handsome plant. (B. M. 3542.)

H. aulicum (courtly).* *fl.* large, extremely handsome; petals unequal, obovate, sharply acuminated, patent, striated, within of a rich crimson, green at the base, and above the green is a dark blotch of red-purple; scape rounded, glabrous, 1ft. to 1½ft. high. *l.* broadly strap-shaped, full green, not at all glaucous, closely striated; the apex rather obtuse. *h.* 1½ft. to 2ft. Rio Janeiro. Greenhouse. SYN. *Amaryllis aulica.* (B. M. 2983, 3311.)

H. breviflorum (short-flowered). *fl.* scentless; perianth white, striated; externally slightly tinged with yellow-green, and marked with a central broad, red streak; within, the same red streak is separated by a white line down the middle; scape rounded, glaucous. April. *l.*, spathe of two lanceolate, membranous leaflets. *h.* 3ft. Buenos Ayres, 1836. Stove. (B. M. 3549.)

H. equestre (equestrian).* Barbados Lily. *fl.* orange-green. West Indies, Guiana, Chili, &c., 1810. Stove. (B. M. 305.) There are several very handsome forms of this old species, including the following: *fulgida*, bright orange, margined white; *major*, large, bright orange, with green central star; *flore-pleno*, rich orange, quite double; and *ignescens*, bright light scarlet, with a white throat, which runs out in bars to the centre of the segments. (R. G. 1874, 150.)

H. Johnsoni (Johnson's). *fl.* dull red, with a white stripe down each segment. One of the earliest hybrids; a specially hardy and robust grower, and a very abundant blossomer.

H. miniatum (scarlet). *fl.* red; umbel two to five-flowered; perianth campanulate; limb six-parted, thrice longer than the tube; scape very smooth, rather longer than the leaves. July. *h.* 1ft. Chili, 1832. Stove. (S. B. F. G. ser. ii. 213, under name of *Habranthus miniatus.*)

H. pardinum (leopard-spotted).* *fl.* upwards of 6in. in diameter, very spreading, with scarcely any tube; ground colour rich cream, profusely dotted all over with crimson. Peru, 1866. A splendid greenhouse species. (B. M. 5645.)

H. pratense (meadow). *fl.* brightest scarlet, sometimes feathered with yellow at the base; disposed in umbels on stems about 1ft. high. Chili, 1840. Nearly hardy. This is closely allied to *H. fulgens.* SYN. *Amaryllis pratensis.* (B. R. 1842, 35, under name of *Habranthus pratensis.*)

H. psittacinum (parrot-like). *fl.* green and scarlet. It is unique and beautiful, and has been fruitful in seedlings. (B. M. 3528.)

H. pulverulentum (powdery). *fl.* red, four, ringent, with taper-pointed segments; scape about 2ft., purple at the bottom. April and May. *l.* deep green, conspicuously covered with a cinereous bloom, purple at their base. *h.* 2ft. Brazil, 1819. Stove. (B. M. 2273, under name of *Amaryllis pulverulenta.*)

H. pyrrochroum (flame-coloured). *fl.* deep red, good size, four or five on a scape; throat shading to greenish-yellow. Para, 1863. Stove. (I. H. 1864, 420.)

H. reticulatum (netted).* *fl.* a beautiful soft pink and white about 3in. in diameter; veins darker, and giving the whole flower an interesting netted appearance; scape five or six-flowered. *l.* dark green, with a pure ivory-white midrib. Brazil, 1677. Stove. (B. M. 2113.)

H. solandriflorum (Solandra-flowered). *fl.* drooping, very large; perianth tube very long, slender, pale green; limb somewhat spreading; segments oblong, rather acute, dingy sulphur, or cream-coloured, greenish at the middle of the back; scape terete. May. *l.* rather narrow, ligulate, keeled below, blunt at the apex, about 1ft. long. *h.* 2ft. Guiana, 1839. Stove. (B. M. 2573, 3771.)

H. stylosum (long-styled). *fl.*, limb pale fulvous-pink, veined and speckled with a deeper colour; anthers straw-coloured, striped with red; pollen bright yellow; style 1½in. longer than corolla. *l.* like those of *H. equestre*, but more glossy, and purple at their base. *h.* 2ft. Brazil, 1821. Stove. (B. M. 2278.)

H. sub-barbatum (slightly-bearded). "This beautiful plant, from Rio Janeiro, occupies an intermediate place between *H. fulgidum* and *H. equestre major*, to which last it approximates in the colour and form of the limb, the shape of the star, and the vestige of a beard, which is just distinguishable at the mouth of the tube." Stove. (B. M. 2475.)

Hippeastrum—*continued.*

H. vittata (striped).* *fl.* clear white, with double red stripes on each perianth-segment. One of the most beautiful species; it has proved the most fruitful parent of many of the finest varieties. Greenhouse. (B. M. 129.)

HIPPIA (from *hippos*, a horse; application doubtful). ORD. *Compositæ.* This genus comprises four species of slender greenhouse herbs or branching sub-shrubs, all natives of South Africa. Flower-heads yellow, minute, rayless, something like those of the Chamomile. Leaves alternate, pinnatifid or pinnatisect, rarely entire. Hippias thrive in a peat and loam compost. Propagated by cuttings, or by seeds.

H. frutescens (shrubby). *fl.-heads* yellow, corymbose. February to August. *l.* pinnatifid. *h.* 6in. 1710. Plant shrubby, villous. (B. M. 1855.)

HIPPION. A synonym of **Gentiana** (which *see*).

HIPPOBROMUS (from *hippos*, a horse, and *bromos*, a bad smell; reason for name not given by its author). It is the Paardepis of the Dutch colonists. ORD. *Sapindaceæ.* A monotypic genus, the species being a greenhouse resin-bearing tree of considerable size. It thrives in sandy loam. Propagated by cuttings, inserted in sand, under a hand glass.

H. alatus (winged). *fl.* reddish, small, from the axils of the leaves, regular, polygamous; sepals persistent, rotundate, concave, unequal, broadly imbricate; petals five, obovate, glabrous. *l.* alternate, exstipulate, abruptly pinnate; leaflets sessile, sub-opposite, dentate, serrate, or entire. South Africa.

HIPPOCASTANEÆ. Included under *Sapindaceæ.*

HIPPOCENTAUREA. A synonym of **Erythræa** (which *see*).

HIPPOCRATEACEÆ. A tribe of *Celastrineæ.*

HIPPOCREPIFORM. Horseshoe-shaped.

HIPPOCREPIS (from *hippos*, a horse, and *krepis*, a shoe; in allusion to the shape of the pod). Horseshoe Vetch. ORD. *Leguminosæ.* A genus comprising about twelve species of pretty, usually hardy, herbs or low shrubs, inhabitants of Europe, North Africa, and Western Asia. Flowers yellow, nodding, honeyed; peduncles axillary. Leaves impari-pinnate; leaflets entire, exstipellate. The species are of very easy culture in ordinary garden soil, and may be increased by division of the root, or by seeds. *H. balearica* requires greenhouse or frame protection in winter, and thrives in a peat and loam soil.

H. balearica (Balearic). *fl.*, peduncles longer than the leaves, bearing an umbel of flowers at the apex. Summer. *h.* 1ft. to 2ft. Minorca, 1776. Plant shrubby, erect, half-hardy. (B. M. 427.)

H. comosa (tufted). *fl.* disposed similar to those of *H. balearica.* Spring and summer. *l.*, leaflets seven to eleven, obovate, obtuse. Stem herbaceous, prostrate. South and West Europe (Britain), North Africa. (Sy. En. B. 380.)

HIPPOMANE (from *Hippomanes*, the old Greek name for a kind of spurge, used by Theophrastus, and meaning, literally, mad after horses; referring to its effect on mares). SYN. *Mancinella.* ORD. *Euphorbiaceæ.* A monotypic genus, the species being a tall, milk-bearing, very poisonous tree. It thrives in a mixture of sandy loam and peat. Propagated by cuttings, inserted in sand, under a glass, in heat.

H. Mancinella (Manchineel). Manchineel-tree. *fl.* small, inconspicuous, and of separate sexes. May. *fr.* a roundish, fleshy, yellowish-green berry. *l.* stalked, shining-green, egg-shaped or elliptical, with the edges cut into saw-like teeth, having a single gland on the upper side, at the junction of the stalk and leaf. *h.* 40ft. to 50ft. West Indies, Central America, 1690. (R. G. 510.)

HIPPOPHAE (from *Hippophaes*, the old Greek name for a prickly spurge, used by Hippocrates). Sallow Thorn; Sea Buckthorn. ORD. *Elæagnaceæ.* A hardy deciduous shrub. It is of easy culture in common garden soil, and is especially useful for growing near the sea-coast. Propagated by layers, by suckers, by cuttings of the roots, or by seeds.

H. rhamnoides (Rhamnus-like).* *fl.* yellow, dicœcious, axillary, pedunculate, small. May. Berries of a bright orange-colour,

Hippophae—*continued.*

l. linear-lanceolate, bluntish, dotted, silvery beneath. Branches ending in a spine. *h.* 2ft. to 20ft. Europe (England), North and Central Asia, Himalaya. *H. salicifolia*, the Himalayan form of the species, is hardly different from the one which is found on the English coasts. (Sy. En. B. 1245.)

HIPPURIS (the old Greek name used by Dioscorides, from *hippos*, a horse, and *oura*, a tail; in allusion to the resemblance of the stem to a horse's tail). ORD. *Haloragaceæ*. A genus comprising one or two species of glabrous aquatic herbs, natives of Europe, Central and Northern Asia, North and Antarctic America. *H. vulgaris* is the only species which calls for special mention. It is a perennial, and thrives in a bog, pond, or marshy situation. Propagated by division of the roots, or by seeds.

H. vulgaris (common). Common Marestail. *fl.* greenish, minute; anthers red. Summer. *l.* linear, strap-shaped, entire. Stems simple, erect; upper part projecting out of the water sometimes to the height of 8in. or 10in., crowded by whorls of from eight to twelve leaves. Europe (Britain), Asia, &c. (Sy. En. B. 516.)

HIRSUTE. Clothed with somewhat soft hairs.

HISPID. Covered with rather stiff hairs.

HOARY. Covered with grey or whitish hairs, not readily distinguished by the naked eye.

HODGSONIA (named after B. H. Hodgson, F.L.S.). ORD. *Cucurbitaceæ*. A genus consisting of only one (or perhaps two) species. *H. heteroclita* is a remarkable shrub, native of Eastern Bengal and the Malay Archipelago. It requires an almost tropical heat and damp in summer, but not in winter, when it ought to be kept more cool and dry. It has not yet flowered in this country. Propagated from imported seeds, or by cuttings, inserted in sandy soil, under a bell glass, in bottom heat.

H. heteroclita (anomalous). *fl.* yellow outside, white within, large, with long filiform twisted appendages hanging from their lobes; very deciduous. May. *fr.* large, melon-like. *l.* persistent, coriaceous, palmately lobed; lobes entire. The stems are described by Sir Joseph Hooker as slender, frequently 100ft. long, climbing the forest trees, and having their branching ends matted together, and covered with leaves, which sometimes form a dense hanging screen of bright green foliage. (C. H. P. 1, 2, 3.)

HOES and **HOEING.** There are numerous forms and varieties of Hoes adapted for use, according to the special purpose for which any are required, and the condition or nature of the soil, whether light or heavy. They are indispensable garden implements for drawing

FIG. 231. SWAN-NECKED DRAW HOE.

drills for seeds, thinning and cleaning crops, breaking the surface of the soil, earthing up, &c. The principal forms are the Draw Hoe and the Dutch or Thrust Hoe, both of which are manufactured in many widths. Draw Hoes were originally all made with a short neck, and a circular eye for fixing the handle in. In using these, the soil

FIG. 232. TRIANGULAR HOE.

gets much clogged on and around the eye. A great improvement, which prevents this clogging considerably, has now been effected by the almost general use of the shape known as the Swan-necked (see Fig. 231). In these, the handle is inserted in a socket, which is con-

Hoes and **Hoeing**—*continued.*

nected with the blade by a curved solid neck. The blade should be made of steel plates, welded on iron necks. This process was previously thought impossible, or at least difficult, but is now readily accomplished. The width of the plate varies from 2in. to 9in. in the different sizes. Hoes with a flat triangular head, and three points (see Fig. 232), are sometimes used for making

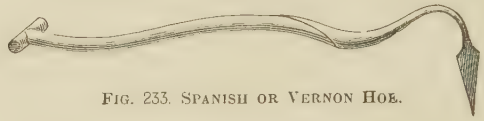


FIG. 233. SPANISH OR VERNON HOE.

drills; and the Spanish or Vernon Hoe (see Fig. 233) is a form with only one point. Dutch Hoes (see Fig. 234) are very useful for destroying weeds, or for loosening the surface, where the soil is not too stiff or wet.

FIG. 234. DUTCH HOE.

A workman, in using the Dutch Hoe, walks backwards, and, consequently, does not tread on the ground after it is finished, as he does with the Draw Hoe. A combination Draw Hoe, or Mattock and Fork, sometimes termed

FIG. 235. DRAW HOE AND FORK COMBINED.

a Pickfork, is shown in Fig. 235. It is very useful for loosening and breaking hard lumps of soil, and the forked part is frequently utilised with advantage in unloading manure. Another and stronger form of a similar descrip-

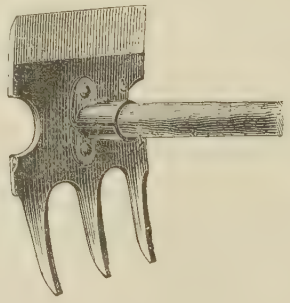


FIG. 236. DRAG HOE OR PICKFORK.

tion is represented in Fig. 236. Hoeing forms a considerable portion of routine work in gardens. Nearly all crops are much benefited by the surface soil being kept loose; and large numbers of seedling weeds are destroyed, at the same time, by running the Hoe through in dry weather. The thinning of crops is much practised with Draw Hoes. It should only be entrusted to workmen who understand the use of the implement, as, otherwise, many plants will be cut up that should have remained.

HOFFMANNIA (named after G. F. Hoffmann, 1761-1826, Professor of Botany at Gottingen, &c.). Including *Campylobotrys*. SYNS. *Higginsia*, *Ohigginsia*. ORD. *Rubiaceæ*. A genus comprising about twenty species of herbs or shrubs, natives of tropical America. Flowers white, yellow, or red, small, in axillary, few-flowered, occasionally unilateral, pedunculate or sub-sessile cymes. Leaves opposite, or two to four-nate, verticillate; stipules interpetiolar, small, broadly triangular or transversely oblong-linear, deciduous. Hoffmannias will thrive in the open air in summer, if planted in sandy soil; but they require the protection of a greenhouse in winter. Propagated by cuttings, inserted in sandy soil, under a bell glass, in bottom heat.

Hoffmannia—*continued.*

H. pedunculata (pedunculate). *fl.*, corolla yellow, and variegated with red, rotate; racemes few to eight-flowered, peduncled; peduncles as long as, or exceeding, the petiole. *l.* elliptical, pointed, cuneate at the long-petioled base, glabrescent above, rusty-pilose, with scattered down beneath. *h.* 2ft. to 3ft. Jamaica (in mountain woods).

H. refulgens (shining).* *fl.* pale red, upwards of 1in. across, in solitary cymes; corolla lobes much longer than the tube; peduncles solitary, axillary, erect, purple-red, shorter than the leaves. May. *l.* 3in. to 5in. long, narrow-obovate, sub-acute, contracted at base, but not petioled; upper surface dull green, suffused with red, especially towards the margins; under surface pale reddish. Branches purple, erect. *h.* 1ft. to 2ft. South America. (B. M. 5346, under name of *Higginsia refulgens.*)

H. regalis (royal). *fl.* aggregate, sub-sessile, unattractive. August. *l.* roundly-ovate, acuminate, entire, sub-coriaceous, plicato-penninerved, glabrous, shining dark green above, reddish-purple beneath; stipules triangular, deciduous. Branches sub-succulent, obtuse, tetragonal. *h.* 1ft. Mexico, 1859. A robust stove shrub. (B. M. 5280, under name of *Higginsia regalis.*)

FIG. 237. HOLBŒLLIA LATIFOLIA, showing Flowering Branch and detached Female Flowers.

HOG PLUM. *See* **Spondias** and **Ximenia americana.**

HOHENBERGIA. Now included under **Æchmea** (which *see*).

HOITZIA. A synonym of **Lœselia** (which *see*).

HOLBŒLLIA (named after Fred. Louis Holböll, once Superintendent of the Botanic Garden at Copenhagen). ORD. *Berberideæ*. A genus of only two species. *H. latifolia* is an interesting cool greenhouse evergreen climbing shrub. It is of easy culture in any light soil. Propagation is effected by cuttings, made of half-ripened shoots, in spring.

H. discolor (two-coloured).* This species "is remarkable for the lurid-green yet satiny surface or velvety gloss of the upper side of the leaves, and the rich red-purple tints of the branches and under side of the foliage, and the still more pronounced red colour of the peduncles and flowers and teeth of the calyx" (Sir W. J. Hooker). *h.* 6in. Mexico, 1850. Stove. (B. M. 4530, under name of *Campylobotrys discolor.*)

H. Ghiesbreghtii (Ghiesbreght's).* *fl.* yellow, spotted red on the disk, inconspicuous; cymes on short axillary peduncles. *l.* large, 1ft. or more long, broad oblong-lanceolate, acuminate, entire, much decurrent and attenuated at the base, so as to be perfoliate, strongly penninerved and sub-plicate; upper surface rich dark velvety-green above, very slightly pubescent; under surface dull purple-red, veins very prominent. Branches green, herbaceous, elongated. *h.* 2ft. to 4ft. South America, 1861. (B. M. 5383, under name of *Higginsia Gheisbechtii.*) *variegata* is a form with leaves blotched with creamy-white, yellow, and red.

H. latifolia (broad-leaved). *fl.* purple or greenish, very fragrant; racemes axillary, corymbose; peduncles longer than petioles. March. *l.* ternate or quinate, coriaceous; leaflets oblong, obtuse, mucronate. *h.* 20ft. Himalaya, 1840. See Fig. 237. (B. R. 1846, 49.) *H. l. angustifolia* is a form having seven to nine linear-lanceolate leaflets.

HOLCUS (*Holkos*, the old Greek name of a grass). Soft Grass. ORD. *Gramineæ*. A genus of eight species of annual or perennial grasses, natives of Europe, temperate Asia, North and South Africa. Panicles loose; spikelets compressed, two-flowered. The species are of easy culture in ordinary soil. The only one worth growing is the following:

H. lanatus albo-variegatus (woolly, white-variegated). *l.* soft, pubescent, with a broad central and narrow green stripes,

Holcus—*continued.*

the intermediate spaces and margin of a clear silvery-white. A well-marked, variegated perennial plant, forming a very neat tuft.

HOLLY. *See* **Ilex.**

HOLLYHOCK (*Althæa rosea*). The Hollyhock is a very old inhabitant of our gardens, and, where it succeeds, is one of the finest autumnal flowers for the decoration of our gardens and shrubberies. Of recent years, the Hollyhock disease has played such havoc amongst the plants, that their cultivation has become a

FIG. 238. FLOWERING STEM OF HOLLYHOCK.

matter of extreme uncertainty, and has, consequently, been somewhat neglected. At one time, not long since, the Hollyhock was considered an important florists' and exhibition flower, splendid double varieties having been selected and raised by some few hybridisers, who devoted special attention to its improvement. Propagation is effected by seeds, by cuttings, and by divisions; also sometimes by eyes, obtained from side shoots when they are getting firm, in July or August, and placed in light soil, under a shaded hand glass. Seeds should be saved from the finest sorts, and sown, so soon as ripe, in pots or pans, being placed in a slight bottom heat,

Hollyhock—*continued.*

or in the open air, in June or July. The seedlings should be transferred, in either case, when large enough, into 3in. pots, and wintered in a cold frame. This method is adopted to obtain new varieties, and for securing a large number of plants for ordinary decoration. The usual mode of propagation is by cuttings, about 3in. long, consisting of young shoots, which may be taken off close to the old root, at nearly any time of the year. They should be placed singly in small pots of light sandy soil, and kept close and shaded in a cold frame until roots are emitted. If propagation by cuttings is practised in winter, a gentle bottom heat should be given them. Division of the roots may be effected, after flowering is over, by separating the crown, so as to preserve one or more buds, and as many roots as possible, to each piece. Cuttings are generally preferred to divisions, but either plan will answer.

Outdoor Cultivation. Hollyhocks succeed—if they are not attacked by the disease—in almost any good garden soil. If in any way poor, it should be previously well trenched and manured, or strong spikes will not be obtained. The young plants should be wintered near the glass in cold frames, admitting plenty of air and giving only a little water. They must not be allowed to become starved for want of root-room when young. Gradually harden off in March, and plant out, about the middle of April, where they are intended to flower. A few for late flowering may be planted a month later. Space of about 3ft. every way will not be too much between the plants. They should be protected on cold nights until established, and be supplied with plenty of water throughout the summer. A top-dressing of well-decayed manure is beneficial when the flower-spikes are pushing up. Strong plants may be allowed two or three spikes, but the weaker kinds should be reduced to one by removing all the other side growths when young. A stiff stake will be requisite for each plant, and it should be inserted before injury is caused by rough wind. In a sunny position and good soil, Hollyhocks reach a height of 8ft. or 10ft., and flower from about 3ft. above the ground nearly to the points (see Fig. 238). After flowering is over, the spikes should be cut down to about 6in. from the base; and if the varieties are choice, they should be lifted before winter, and stored, like seedlings, &c., in frames. Where the soil is tolerably dry, and the winter not very severe, Hollyhocks keep all right in the open ground. Small pieces of choice sorts may also be grafted on roots obtained from vigorous seedlings.

Varieties. Good collections of Hollyhocks still exist, and, in some places, are successfully cultivated. Should the disease diminish its attacks, and allow of named varieties (of which the following is a good selection) being again generally grown, no doubt they will receive the attention they merit, both for general decoration and for exhibition. Seedlings, from good varieties, are much cultivated, and frequently answer their purpose equally as well as named sorts.

ACME (Chater), peach-colour, extra fine; ALBA SUPERBA, pure white, fine spike; BLACK GEM, glossy blackish-maroon, good; CARUS CHATER, reddish-crimson, very fine; COMPETITOR, deep rich purple, extra; CONQUEST, dark crimson; CONSTANCE, delicate pale flesh, with a dark base; CYGNET, pure white, large flowers and good spike; DECISION, puce, long close spike; DUCHESS, rosy-peach, good; EARL OF BREADALBANE, light red, fine full flower; ECLIPSE, bright rosy-red, extra fine; ELEANOR, soft pale rose, good; EMPEROR, dark crimson-maroon; GOLDEN DROP, bright deep yellow, large flower; JAMES MACDONALD, shining-red, fine spike; JESSIE DEAN, clear dark amber; JOSHUA CLARK, bright cherry, fine; LADY MIDDLETON, purple, very large flower; LILAC PERFECTION, pale lilac, good; MARVELLOUS, deep orange-buff, full; MISS ASHLEY, rose, fine spike; MODEL, light crimson; MR. CHATER, amber, tinged with crimson, full flower; MRS. EDWARDS, pure salmon, extra; MRS. ELLIOTT, white, shaded and tinged lilac; NELSON, light purple, large flower; OCTAVIA, rose-pink, very fine; PERFECTION, white, suffused reddish-salmon; PRINCESS, white, suffused salmon, large and

Hollyhock—*continued.*

fine; QUEEN OF WHITES, white, large flower, and fine spike; QUEEN OF YELLOWS, golden-yellow, large spike, extra; SCARLET GEM, bright scarlet; SULTAN, purple, large flower; W. BACKHOUSE, bright rose; W. THOMSON, purple, large flower and fine spike.

HOLLYHOCK FUNGUS (*Puccinia Malvacearum*). This fungus is met with on several species of the order *Malvaceæ*, but is particularly hurtful to the Hollyhock. It forms on the lower (seldom on the upper) surface of the leaves small raised spots, at first red-brown, but becoming darker. On the other side of the leaf, the spot is indicated by a discoloured mark. If the attack is severe, the leaves are destroyed, and the plants perish. On microscopic examination, the raised spots are found to be made up of spores of a Puccinia supported on very long hyaline pedicels. These spores are at first covered by the epiderm, but are exposed by bursting through it. This fungus is known only in the Puccinia form; and the spores have been found to germinate almost as soon as mature. The rapid germination explains, probably, the wide and speedy diffusion of the fungus in Europe, in the years 1873 and 1874. It is believed to be a native of Chili, from which country the types of the species were obtained by Montagne. In Europe, it was first observed as dangerous to Hollyhocks in 1873; though specimens were found in Spain as early as 1869. In the former year, it appeared, almost simultaneously, in France and in various places in England; and, in the autumn, in Germany also. Next year, it spread through Germany, Holland, Hungary, and parts of Italy. For a time, it proved most destructive to Hollyhocks; but, as has occurred with other parasitic fungi, its virulence has greatly abated in later years. The best means of treatment is to destroy all leaves as soon as they show signs of being attacked, and to prevent the growth of the other food-plants of the fungus in the neighbourhood of Hollyhocks.

HOLLY-LEAF FLY (*Phytomyza Ilicis*). Holly leaves are very often disfigured by irregular pale blotches on the upper surface. These are spaces mined in the green cellular tissue, and are the work of the larvæ of the Holly-leaf Fly. Usually, two or three larvæ are to be found in a leaf, each in its own mine. They are under a line in length, yellowish-white, with black mouth. The small, oval, brown-ringed pupæ may be found in the mine, covered by the lower epiderm of the leaf; and there they remain all winter, disclosing the flies in early summer of the next year. The fly is rather under one line long, black, with proboscis pale yellow, except the black palpi and hairs; knees and base of tibiæ paler; wings transparent, much longer than abdomen. The most successful way to destroy the insects seems to be the removal and burning of the mined leaves; but this is hardly necessary, except in very select varieties of the plants, since the mines do not appear to cause much injury, unless very numerous.

HOLLY, SEA. *See* **Eryngium maritimum.**

HOLM OAK. *See* **Quercus Ilex.**

HOLMSKIOLDIA (named after Theodor Holmskiold, 1732-1794, a Danish botanist). SYN. *Hastingia.* ORD. *Verbenaceæ.* This genus comprises three species of glabrous or hoary pubescent shrubs. Flowers in shortly-stalked, axillary cymes, or crowded at the tips of the shoots. Leaves opposite, entire or dentate. *H. sanguinea*, the only species yet introduced, is a stove evergreen shrub. It thrives in any light, rich soil. Cuttings root readily in sandy soil, under glass, in heat.

H. sanguinea (blood-coloured). *fl.* scarlet, racemose, composed of a few two to four-flowered whorls; calyx large, sub-rotately campanulate; corolla with an elongated incurved tube. *l.* petiolate, ovate, acuminated, hardly toothed. *h.* 4ft. India, 1796. (B. R. 692.)

HOLOGYMNE. Now included under **Lasthenia** (which *see*).

HOLOSERICEOUS. Covered all over with silky down.

HOMALANTHUS (from *homalos*, smooth, and *anthos*, a flower). SYN. *Carumbium.* ORD. *Euphorbiaceæ.* A genus of seven or eight species of stove evergreen shrubs, natives of the Malayan Archipelago, the Pacific Islands, and Australia. Flowers unisexual, inconspicuous, in terminal racemes. Leaves entire, long-stalked. For culture, *see* stove species of **Euphorbia.**

H. fastuosus (proud). *fl.* greenish. *l.* peltate. Philippines, 1866.

H. polyandrum (many-stamened). *l.* alternate, broadly-ovate, clear glaucescent-green above, rich vinous-purple beneath. Lord Howe's Island, 1876. A handsome, erect-growing shrubby plant, with a glabrous terete stem.

H. populifolia (Poplar-leaved). *fl.* white. August. *h.* 6ft. Australia, 1825. (B. M. 2780, under name of *Omalanthus populifolia.*)

HOMALIEÆ. A tribe of *Samydaceæ.*

HOMALOMENA (from *homalos*, flat, and *nema*, a filament; alluding to the shape of the stamens). Including *Curmeria.* SYN. *Homalonema.* ORD. *Aroideæ* (*Araceæ*). A genus of about twenty species of very ornamental stove, herbaceous or shrubby, foliage plants, natives of Asia and tropical America. For culture, *see* **Caladium.**

H. peltata (peltate). *fl.*, spathe persistent 6in. to 7in. long, constricted in the middle, acuminate at the apex, pinkish, spotted with greenish internally; spadix about the length of the spathe, cream-coloured. *l.* about 24in. long by 16in. to 17in. wide, rather pubescent, deeply cordately two-lobed; lobes rounded. *h.* 3ft. Columbia, 1877. (G. C. 1877, 273.)

H. picturata (painted). *fl.*, spathe green; the spadix white. *l.* cordate, two basal lobes rounded, ovate or oblong, pointed, marked along the midrib with a narrow silvery-white band. *h.* 4in. to 5in. Columbia, 1873. (R. G. 1877, 891.)

H. Roezlii (Roezl's).* *fl.*, spathe olive-brown outside, creamy within. *l.* on long petioles, ovate-oblong, rounded or slightly tapering at the base, not cordate, sparsely spotted with a few yellow blotches. *h.* 6in. Columbia, 1875. (G. C. 1874, 804, under name of *Curmeria Roezlii.*)

H. rubescens (reddish). A synonym of *H. rubra.*

H. rubra (red). *fl.*, spathe sub-cylindrical, convolute, reddish-purple without, whitish within. *l.* sagittate-cordate, dark green; under surface purplish; petiole deep red. *h.* 1ft. to 2ft. Java, 1870. SYN. *H. rubescens.*

H. Wallisii (Wallis's).* *fl.*, spathe about 3in. long, constricted in the middle, reddish; spadix red, nearly as long as the spathe. *l.* shortly stalked, slightly oblique, ovate-oblong, rounded and slightly tapering at the base, abruptly acuminate at the apex, bordered with a white edge, sprinkled with bright golden blotches on the upper surface. Columbia, 1877. SYN. *Curmeria Wallisii.* (B. M. 6571.)

H. Wendlandii (Wendland's). *l.* sagittate-cordate, about 1½ft. long and 1ft. broad, upper surface dark green, polished and paler below; petioles 2½ft. long, dark red at the base. Costa Rica.

HOMALONEMA. A synonym of **Homalomena** (which *see*).

HOMERIA (from *homereo*, to meet; the filaments are connected in a tube around the style). ORD. *Irideæ.* A small genus of handsome greenhouse bulbs, allied to *Morœa*, natives of South Africa. Flowers usually orange-red, copper-coloured, or yellow, very showy, and enduring; scapes leafy, branching. Leaves linear-ensiform. For culture, *see* **Ixia.**

H. aurantiaca (golden). *fl.* orange-red, yellow. Summer. *l.* narrow, radical, few, fistulose, sheathing. *h.* 1ft. 1810. SYN. *Bobartia aurantiaca.* (B. M. 1612, under name of *Morœa collina miniata minor.*)

H. collina (hill). *fl.* reddish or yellow. Summer. *l.* narrow, convolute, concave; in the flowering plant generally cauline. *h.* 1ft. 1793. (B. M. 1033, under name of *Morœa collina.*)

H. elegans (elegant). *fl.* yellow and dull blue or orange-brown. *l.* broader than those of *H. aurantiaca* and *H. collina.* *h.* 1ft. 1797. (B. M. 1283, under name of *Morœa spicata.*)

H. lineata (lined-leaved). *fl.* red, yellow. Summer. *l.* with a white midrib, broadly linear, acute, somewhat leathery. *h.* 2ft. 1825. (S. B. F. G. 178.)

HOMOGAMOUS. When all the florets of a capitulum, &c., are hermaphrodite.

HOMOGENEOUS. Having a uniform nature or composition.

HOMOGYNE (from *homos*, the same, similar, and *gyne*, female; so called from the similarity of the female flowers to the others). ORD. *Compositæ*. A small genus, comprising but three species of stemless, hardy herbs, natives of the mountains of Europe. Flower-heads white or purple; scapes one or two-headed, furnished with one or two distant leaves. Leaves radical, broad, cordate, angular or sinuato-dentate. The species thrive in any tolerably damp garden border.

H. alpina (alpine). *fl.-heads* light purple, discoid; scape one-flowered, nearly naked. March to May. *l.* reniform, toothed, smooth. *h.* 6in. Austria, 1710. (B. M. 84, under name of *Tussilago alpina*.)

H. discolor (two-coloured). *fl.-heads* inodorous; scape solitary, terete, purple, clothed with whitish wool. June and July. *l.* radical, sub-rotund, cordate at base, acutely crenulated, thick, firm; upper surface green, shining-glabrous, boldly nerved; under surface densely and shortly tomentose. *h.* 6in. Austria to Italy, 1633. (J. F. A. iii. 247, under name of *Tussilago discolor*.)

HOMOIANTHUS. Now included under **Perezia** (which *see*).

HONCKENYA (named after G. A. Honckeny, 1724-1805, author of a Flora of Germany). SYN. *Clappertonia*. ORD. *Tiliaceæ*. A monotypic genus. The species is a stellato-pubescent stove shrub, from tropical Africa. It thrives in a mixture of loam and peat. Propagated by young cuttings, inserted in sand, under a hand glass, in heat.

H. ficifolia (Fig-leaved). *fl.* bluish-violet, large, terminal, in threes. *l.* dentate, or three to seven-lobed.

HONESTY. *See* **Lunaria biennis.**

HONEY BEE (*Apis mellifica*). This is not the suitable occasion to give a full account of the structure and habits of the Honey Bee, or Hive Bee, and of its allies; but these insects are of such great value to horticulturists, because of the part they perform in the conveyance of pollen from flower to flower, and thereby securing the production of healthy seed, that they cannot be passed by in silence. Their habits, &c., will be again treated of under **Wasps** (which *see*), with which they agree in many of their social customs. The Bees form a numerous group of insects, with a considerable general similarity of aspect. All have the habit of making cells for the protection of the eggs and larvæ. The Solitary Bees form these cells either in galleries hollowed out by themselves, or in holes or nests, built by them of mud or

Worker. Queen. Drone.

FIG. 239. HONEY BEES.

other materials. The Humble Bees and Honey Bees build the cells of wax secreted from their bodies. They collect the pollen and the honey or nectar from flowers, and feed their larvæ on a mixture of these substances: hence, they have to make constant visits to flowers. The honey is also stored up in wax cells as food for their own use in winter. Among the Solitary Bees, only males and females can be distinguished, and the latter do all the work of providing for the larvæ. The Honey Bees comprise males or drones, perfect females or queens (usually one in each nest), and undeveloped females, called neuters or workers. The accompanying woodcuts (see Fig. 239), which were engraved from drawings made by Mr. Frank Cheshire, for his large work on Bee-keeping, show the relative sizes and forms of the three. After the queen is impregnated, the drones are killed by the workers.

Honey Bee—*continued.*

The queen's share in providing for the welfare of the community is restricted to laying eggs. On the workers falls all the work, viz., attending to the young brood, collecting food, and such-like duties. If, by any accident, the queen is lost, the workers can cause a worker-larva to develop into a queen, by supplying it with special food and enlarging the cell in which it lives. Returning now to the relation of Bees to flowers, we find that they are specially suited to remove the honey from flowers in which it is situated at the bottom of a tube of more than ¼in. long. The proboscis of the worker is formed of five pieces, of which the central piece (tongue) bears hairs near the tip, and is used to lick up the honey with. Flowers with honey at the bottom of narrow tubes, are specially attractive to Honey Bees, as in such it is beyond the reach of most other insects, and affords, therefore, a good supply to the Bees. To fit the workers for collecting the pollen, their hind legs have the middle joint (tibia) concave on one side, and furnished with rows of hairs, so placed as to retain the pollen, as in a shallow vessel. Certain flowers are of such a form that few other insects than Bees can reach the pollen or the nectar in them. Flowers adapted for fertilisation by Bees, *e.g.*, Antirrhinum, have the stamens and stigmas so situated that, in visiting the flowers, the insects must become dusted with the pollen, and it is conveyed to the stigma of the next flower of the same kind visited by them. Hence, they generally effect cross-fertilisation, the value of which, in the production of well-developed and healthy seeds, has been proved by experiment in many kinds of plants. (*See* Darwin's "Cross and Self-Fertilisation in the Vegetable Kingdom.") The Honey Bee seldom extracts the honey through holes bored in the flower tube, as the Humble Bee sometimes does, to the detriment of the flowers. On comparing the various kinds of Bees with the Honey Bee, the latter is found to be the most perfectly adapted of all the species for the collection of honey and pollen, and for insuring cross-fertilisation of the flowers it frequents to obtain these. Honey Bees usually restrict their visits more or less to one or two species of plant each day. Works that give much information on Bees are, among others: Huber's "New Observations on the Natural History of Bees," Kirby and Spence's "Introduction to Entomology," Bevan's "The Honey Bee," Shuckard's "British Bees," and Cheshire's "Bee-keeping: its Science and Practice."

HONEY BERRY. *See* **Melicocca bijuga.**

HONEYDEW. The name given to a sweet sticky substance, abundant on the leaves of many plants in summer, especially when the weather is warm and dry. It gives the parts on which it lies the appearance of being wet or varnished. Though it may occur on almost any parts of plants, it is most abundant on the leaves, where it is almost always restricted to the upper surface, covering it uniformly, or in the form of minute spots crowded on the spaces between the veins. It is more abundant on woody plants than on herbs. Various causes have been assigned for its production; the belief was at one time entertained that it fell from the air. Afterwards, it was observed that aphides and certain allied insects secreted a fluid similar in its qualities to Honeydew, and that this secretion became sprinkled over adjoining bodies; and it was suggested that these insects were the producers of the Honeydew. The fact that the substance covers the *upper* surface of the leaves, while the insects are almost always found on the lower surface, was accounted for by supposing that the secretion fell from the insects on to the leaves beneath. There is no doubt that this is one mode in which the Honeydew is produced; but it has frequently been observed that plants, both in the open air and in houses, have been much covered with the coating, when no insects could be found

Honeydew—*continued.*

on the plants, or in their neighbourhood. Sometimes, in such case, there is no appearance of disease in the leaves that bear it; but, at other times, they become discoloured, the green colouring matter, or chlorophyll, is destroyed below the shining patches, and the leaves may fall off early. Under these circumstances, the sweet fluid must be produced in, and exuded from, the cells of the leaves without any extraneous producer. Its production may, then, be regarded as analogous to the secretion of similar fluids in nectaries on various green parts of many healthy plants, *e.g.*, on the stipules of Beans; but, when carried to excess, it becomes a disease. The cause, or causes, of the change are still only conjectural; and so also are the means for preventing and curing attacks. Among grasses, Honeydew may be produced in yet a third way, viz., in the development of the Ergot Fungus (*Claviceps purpurea*), so plentiful, in many years, in the heads of numerous species of grasses. In the early stage, before the Ergot has yet become conspicuous in the ear, the fungus produces a body (*Sphacelia segetum*) that bears on its surface numerous spores, imbedded in a sticky fluid like Honeydew. When the fungus is very plentiful among grasses, this fluid is correspondingly abundant. It assists in the diffusion of the spores of the fungus, as flies are very fond of it, and visit the diseased plants, suck up the secretion, and carry it away, with spores imbedded in it, to other grasses, where the spores, in their turn, may propagate the species. The Honeydews of different plants probably vary a little in chemical composition; but all contain a considerable quantity of sugars, including Mannite and cane sugar. It is to these that the sweet taste is due. Plants covered with Honeydew, whatever its origin, are very attractive to insects, especially to flies, and, at night, to moths. Several kinds of fungi also find it very favourable for their development: hence, plants covered with it are apt to assume a sooty appearance, due to the growth in them of black or brown fungi (*Capnodium*, &c.). Particles of soot or dust are also apt to stick to the leaves. Such extraneous substances, along with the secretion itself, hinder the healthy processes in the leaf from being properly carried on, though the stomata, or breathing pores, usually escape being clogged, as they are more abundant on, if not confined to, the lower surface of the leaves, and this is not covered. The abundant exudation of sugars must also weaken the plants; but the effect is seldom dangerous—a fortunate circumstance, in our ignorance of methods of cure.

HONEY FLOWER. *See* **Melianthus.**

HONEY LOCUST. *See* **Gleditschia triacanthos.**

HONEYSUCKLE. *See* **Lonicera.**

HONEYSUCKLE, AFRICAN. *See* **Halleria lucida.**

HONEYWORT. *See* **Cerinthe.**

HOODED. The same as **Cucullate** (which *see*).

HOODIA (a commemorative name). SYNS. *Monothylaceum*, *Scytanthus*. ORD. *Asclepiadeæ*. A genus comprising three remarkable species of greenhouse succulent perennials, inhabiting Angola and South Africa. Flowers large, often solitary, shortly pedicellate; corolla rotate, with a very short tube, and a large, dilated, faintly five-lobed limb. Stems fleshy, many-angled, Cactus-like, thickly covered at the angles with strong prickles, which are dilated at the base. For culture, *see* **Stapelia.**

H. Bainii (Bain's). *fl.* produced near the apices of the branches, one to three together; calyx short, five-partite; segments acuminate; corolla pale buff-yellow, becoming purplish in decay, cup-shaped, about ⅝in. in diameter; margin with five recurved teeth, the apices of the obsolete lobes; corona double. July. Stems numerous from the crown, ashy-green, cylindric, leafless; younger portion with closely-set, spirally-arranged, laterally-compressed

Hoodia—*continued.*

tubercles, ultimately confluent into more or less marked prominent longitudinal ridges; tubercles tapering into a stout, sometimes deflexed, brown prickle. Karroo, 1875. (B. M. 6348.)

H. Gordoni (Gordon's). *fl.* produced near the apices of the branches, one to three together, shortly petiolate; calyx short, five-partite; corolla with a very short tube; lobes pale brownish flesh-coloured, glabrous. Stems numerous from the crown, erect or somewhat spreading, cylindric, slightly branched, leafless; younger portions with closely-set, spirally-arranged tubercles, each with a strong, slightly-deflexed prickle swollen at the base. Orange River, 1874. (B. M. 6228.)

HOOKERA. A synonym of **Brodiæa** (which *see*).

HOOP PETTICOAT. *See* **Narcissus Bulbocodium.**

HOP. *See* **Humulus Lupulus.**

HOP APHIS. *See* **Aphides.**

HOP FLEA. *See* **Turnip Fly.**

HOP HORNBEAM. *See* **Ostrya.**

HOPLOPHYTUM CALYCULATUM. *See* **Æchmea calyculata.**

HOPLOPHYTUM CŒLESTIS. *See* **Æchmea cœlestis.**

HORDEUM (the ancient Latin name). Barley. ORD. *Gramineæ*. A genus comprising about twelve species of valuable erect annual (or rarely perennial) grasses, natives of Europe, Northern Africa, temperate Asia, and extra-tropical America. Spikelets in threes, arranged on opposite sides of the rachis, hence forming a bilateral spike. Barley is, next to Wheat, the most important grain raised in this country. It is principally employed in the manufacture of fermented liquors and spirits. Tradition traces its culture back to remote antiquity, the Egyptians supposing it to be the first cerealea utilised by man. The principal species are: *H. distichon*, Long-eared Barley; *H. hexastichon*, Winter, or Square Barley; *H. vulgare*, Spring Barley; and *H. zeocriton*, the Sprat or Battledore Barley, a cultivated form of *H. distichon*. Probably the best species for horticultural purposes is *H. jubatum*, which thrives in any ordinary soil. Very little moisture is required. Seeds may be sown in the open ground.

FIG. 240. HORDEUM JUBATUM.

H. jubatum (bearded).* Squirrel-tail Grass. *fl.*, lateral ones abortive, on a short pedicel, short-awned; perfect flower bearing a capillary awn, 2in. long, all spreading. June. *h.* 2ft. North America, 1782. See Fig. 240.

HOREHOUND (*Marrubium vulgare*). A hardy herbaceous perennial, widely distributed throughout Europe and Northern Asia, and occasionally found wild in Britain.

Horehound—*continued.*

The product obtained by soaking the leaves and tops in boiling water, has long been a popular medicine for subduing irritating coughs, frequently proving effective when other and more valued remedies have failed. Horehound may be readily propagated by seeds, sown in March; by division of the roots, in spring; or by cuttings, inserted in a shady position outside. Plant about 15in. apart. Keep the ground clean between, and the roots will last several years. The annual growths may be cut when the flowers open, and dried in a cool shed, for use in winter.

HORKELIA. This genus is now included under **Potentilla** (which *see*).

HORMINUM (from *horminon*, the old Greek name given to a kind of Sage, by Dioscorides). ORD. *Labiatæ*. A monotypic genus. The species is an elegant hardy herbaceous perennial, thriving in an open border, in a well-drained situation. It is readily increased by dividing at the root, or by seed.

H. pyrenaicum (Pyrenean). *fl.* bluish-purple, nearly 1in. long, on short pedicels, nodding; whorls distant, six-flowered, secund. Summer. *l.* almost all radical, petiolate, ovate, obtuse, deeply crenated. *h.* 6in. to 12in. Pyrenees to Tyrol, 1820. (S. B. F. G. 252.)

HORNBEAM. *See* **Carpinus Betulus.**

HORNED POPPY. *See* **Glaucium.**

HORNEMANNIA. A synonym of **Mazus** (which *see*).

HORN MANURE. *See* **Manures.**

HORN OF PLENTY. The common name of **Fedia Cornucopiæ** (which *see*).

HORNY. Hard; of the consistence of horn.

HORSE BEAN. *See* **Faba vulgaris equina.**

HORSE CHESTNUT. *See* **Æsculus.**

HORSE-DUNG. The special use of Horse-dung by itself is for Mushroom culture. For this purpose, it is best suited if collected from stables where the horses have been fed chiefly on corn, hay, and other dry food. Horse-dung is of little use when medicine has lately been given to the horses, or when green grass has formed a large portion of their food. Stable litter is much to be preferred for hotbeds, when the whole of the droppings are left in it, as heat is thereby engendered, and the fermenting material much improved. Horse-dung is not so much used for making manure water as sheep, deer, or cow-dung; but that obtained from a large manure heap in wet weather is usually of good quality, and not very liable to burn or otherwise cause injury to plants. Horse-dung may be beneficially applied to cold, heavy soils. It may be used nearly fresh, and dug in with a portion of the litter as well. When not specially applied for rendering heavy soil lighter, but as a manure, it should be previously well turned, and moistened if any part is dry. When a heap is allowed to become very hot, it gets quite dry and white in the middle, the ammonia escapes, and the manure is comparatively worthless. Horse-dung may be used with good results as a top-dressing for producing an immediate action on growing crops.

HORSE-RADISH (*Cochlearia Armoracea*). A well-known hardy perennial, naturalised in Britain and many other countries, and widely cultivated in the temperate regions of the Old World, from the earliest historic periods, for the use of its roots, when scraped into fine shreds, for culinary purposes. Large quantities of roots are imported, but the best home-grown crops are much superior. It grows in almost any position, and is frequently neglected on that account. The best and tenderest roots are those grown on rich soil, which must be of good depth, and, preferably, in a rather moist situation. In private gardens, a large quantity is not usually required, as the roots that have been partly used keep fresh and good, in damp sand, for a long time. Any pieces of root form a crown, and this is the usual method of propagation. The aim should be to obtain roots as large as possible (see Fig. 241) before they are old enough to become hard. There are several methods of cultivation adopted by different growers for attaining this end, the following being considered amongst the most successful: Dig trenches from 2ft. to 3ft. deep, and, when filling them in, throw 15in. of the original top soil into the bottom; then place a layer of good manure over this, and dig it in, afterwards filling up the trench with the soil that was before in the bottom. When several trenches are being prepared, the first may be dug the full depth, and the soil from the one adjoining used as far as the trenches proceed. The object is to get the best soil down low, where the secondary or side roots are, and to have a poorer soil round the portion intended to

Horse-Radish—*continued.*

FIG. 241. HORSE-RADISH.

be used. Some growers trench ground deeply, and make holes with a crowbar, about 1ft. apart, in rows, afterwards dropping a crown, with a portion of root attached, into the bottom. A large proportion succeed when treated in this way, and form straight roots in growing to the surface. Another successful method, which may, perhaps, be considered the best, is that adopted by some cultivators for market: Raised narrow beds are formed, somewhat like those for Asparagus, and any quantity of rich manure dug or trenched into them. In planting, straight roots, from 6in. to 9in. in length, are laid in a horizontal direction, about 1ft. apart, with the head, or crown part, to the outside edge, and covered with about 6in. of soil. The leaves from the crown turn and grow upright, and secondary roots grow from the main one downwards, and supply nourishment for enlarging it.

Horse-Radish—*continued.*

In digging the large roots for use, it is only necessary to insert the spade horizontally beneath them, and lift the whole out. The secondary roots then form an excellent stock for treating in a similar way. Horse-Radish should be allowed two or three years to develop, and a plantation should be made annually to keep a succession. All the side shoots surrounding the crown should be removed, except the strongest one, and the ground frequently hoed between the plants, in summer. Any portion of the root grows, and forms a crown, which sometimes renders the plant a nuisance.

HORSE-RADISH TREE. *See* **Moringa pterygosperma.**

HORSESHOE VETCH. *See* **Hippocrepis.**

HORSETAIL. *See* **Equisetum.**

HORSFIELDIA (named after Thomas Horsfield, 1773-1859, an American botanist). SYN. *Schubertia.* ORD. *Araliaceæ.* A genus comprising two species of tall stove evergreen prickly shrubs, natives of Java, only one of which has yet been introduced. Umbels capituliform, small; panicles sub-sessile. Leaves alternate, petiolate, cordate or peltate, three to five-lobed, or palmately five to nine-fid, tomentose or woolly beneath. For culture, *see* **Aralia.**

H. aculeata (prickly). *fl.* greenish-yellow; panicle terminal, densely clothed with stellate tomentum. *l.* cordate, five-lobed; upper ones three-lobed, covered with stellate tomentum beneath.

HORTENSIA. A synonym of **Hydrangea** (which *see*).

HORTENSIS. Of or belonging to a garden. The word is frequently contracted thus: hort.

HOSACKIA (named in honour of David Hosack, 1769-1835, once Professor of Botany in the University of New York). ORD. *Leguminosæ.* A genus comprising about twenty-five species of pretty dwarf hardy annual or perennial herbs, found in Oregon, California, Mexico, &c. Flowers yellow or reddish, usually disposed in umbels. Leaves impari-pinnate, or rarely trifoliolate. Hosackias are very rare in cultivation, but are well adapted for rockwork, and thrive in any ordinary garden soil. They may be easily increased by seeds, or by divisions.

H. bicolor (two-coloured). *fl.* six to ten in each umbel; standard and keel yellow; wings white. Summer. *l.* with seven to nine leaflets. *h.* 1½ft. North America, 1823. Perennial. SYN. *Lotus pinnatus* (under which name it is figured in B. M. 2915).

H. crassifolia (thick-leaved). *fl.*, umbels capitate, many-flowered, nodding; petals greenish, with chocolate-coloured middles. June. *l.* pinnate, with an odd one; leaflets opposite or alternate, ovate or oval, mucronulate; stipules herbaceous, ovate, acute. *h.* 3ft. California. Perennial. (B. R. 1977, under name of *H. stolonifera.*)

HOSTA (of Jacquin). A synonym of **Cornutia** (which *see*).

HOSTA (of Trattinick). A synonym of **Funkia** (which *see*).

HOTBEDS. These are composed of fermenting material, prepared for supplying heat to plants, either in frames or houses. They are also sometimes used for encouraging growth in tender plants or seedlings in the open air. When properly managed, Hotbeds are extremely useful, especially in spring, in supplying a moist, genial heat for propagating and growing-on all sorts of soft-wooded plants. Cuttings of the various bedding plants required in quantities emit roots and grow much faster on a Hotbed than when placed where there is only fire heat. In preparing fermenting material of the best quality, fresh stable litter should be secured and thoroughly mixed with an equal portion, or a larger quantity, of newly-collected leaves. If any part is dry, it should be well watered when mixing, and the whole heap turned over every alternate day for about a week. By this time, it

Hotbeds—*continued.*

will be ready for forming a Hotbed, by building a heap the shape of the frames to be used, and allowing an extra width of 3ft. all round; or for placing inside any permanent pit of sufficient depth. It is important that the whole should be firmly and evenly trodden, to insure against any one part settling together closer than another, and for securing a uniform heat throughout. All rank steam should be allowed to pass off before any plants are placed inside the frames, and shading should be applied during sunshine, if there is a danger of steam being present. It is well to allow a little ventilation at the top of the frames or pits, night and day, for a short time after beds are newly made up. Hotbeds made up on the surface of the ground, for propagating purposes, should not be less than 3ft. or 4ft. in thickness, apart from the necessary filling up of the frame with similar material. Stable litter, by itself, heats much too violently, and does not last long; when mixed with a good proportion of leaves, the heating properties are somewhat slower, but of a lasting description, and, consequently, much better suited to the requirements of plants. A layer of ashes or cocoa-nut fibre, placed over the surface, is extremely useful for plunging small pots.

HOTEIA JAPONICA. A synonym of **Astilbe japonica** (which *see*).

HOTTENTOT BREAD. *See* **Testudinaria Elephantipes.**

HOTTENTOT CHERRY. *See* **Cassine Maurocenia.**

HOTTENTOT FIG. *See* **Mesembryanthemum edule.**

HOTTONIA (named after P. Hotton, 1648-1709, a Dutch botanist, Professor at Leyden). ORD. *Primulaceæ.* A genus comprising two species of hardy perennial aquatic herbs, natives of Europe, North-west Asia, and North America. Flowers white or lilac, dimorphic, honeyed, in whorls, forming a terminal raceme. Leaves pinnatifid, submerged. *H. palustris*, the species usually seen under cultivation, is a handsome plant. It thrives in shallow ponds. Propagated by divisions, in spring; or by seeds, sown at the same season.

H. palustris (marsh).* Featherfoil; Water Violet. *fl.* lilac, with a yellow eye, similar in shape to the Primrose; whorls numerous. June. *l.* submerged, deeply pinnatifid, with linear segments. *h.* 1ft. to 2ft. Europe (Britain), West Siberia. (Sy. En. B. 1128.)

HOULLETIA (named after M. Houllet, a French gardener). ORD. *Orchideæ.* A genus of about half-a-dozen species of ornamental orchids, natives of Columbia and Brazil. Perianth spreading; sepals nearly free; petals a little smaller, unguiculate; lip continuous with the base of the column, which is erect, arched, and clavate. Houlletias thrive in pots, in a compost of peat and charcoal. Perfect drainage, and a liberal supply of water during the growing season, are needed. Propagation may be effected by divisions of the pseudo-bulbs, as growth commences.

H. Brocklehurstiana (Brocklehurst's). *fl.* 3in. to 3½in. in diameter; petals orange-brown, with darker spots; lip yellow, spotted with dark brown; spikes about six-flowered, from the sides of the short rounded pseudo-bulbs. Summer. *l.* broad, on long petioles, pale green. *h.* 1½ft. Brazil, 1841. (B. M. 4072.)

H. chrysantha (golden-flowered). *fl.* large, 1½in. broad; sepals and petals golden-yellow, profusely blotched with chocolate; lip rich yellow, freckled with crimson; spike from the base of the flask-shaped pseudo-bulbs, six to eight-flowered. *l.* solitary, narrow-elliptic, plaited. Columbia, 1872. (I. H. xviii. 138.)

H. Lowiana (Low's). *fl.* yellowish-white, about 1½in. across; peduncles usually bent forwards or sideways, one to three-flowered. *l.* cuneate, oblong-lanceolate, acute, plaited, unequal. Pseudo-bulbs very short, whitish-green. Columbia, 1874.

H. odoratissima (very sweet-scented).* *fl.* 2½in. across; petals orange-brown, striped with a lighter colour; lip white, tipped with yellow; spike from the side of the pseudo-bulbs. *l.* light green. *h.* 1½ft.

Houlletia—*continued.*

H. o. antioquensis (Antioquian). *fl.*, sepals much broader than those of the type; lip very long, somewhat sagittate, white, tinged with pale yellow; spike erect, many-flowered. Antioquia, 1870. An improvement on the type, with dark green leaves and pseudo-bulbs. (G. C. 1870, 12.)

H. picta (painted).* *fl.* cinnamon-brown, 3¼in. in diameter; sepals narrow-oblong, tips rounded; petals rather smaller, narrowed towards the base; lip shorter than the petals, jointed at the middle; distal portion (epichyle) broadly-hastate, with the broad, blunt, deeply-channelled apex so recurved that the epichyle looks truncate; hypochile somewhat trapeziform, the sides produced backwards into long ascending spurs, that are rather shorter than the column; column yellow, blotched with brown on the back; scape from the base of the pseudo-bulb, stout, ascending, green, six to ten-flowered; sheaths few, short; bracts linear-oblong, green, deciduous; pedicel and ovary ⅔in. long. *l.*, with the slender petiole, 1½in. to 2½in. long, elliptic-lanceolate, acuminate, plaited, green. Pseudo-bulbs tufted, about 3in. long, narrow, ovoid, compressed, grooved. New Granada. (B. M. 6305.)

H. tigrina (tiger-marked). *fl.*, sepals greenish-yellow, barred with brown; petals smaller, rich yellow, barred with crimson; lip white, dotted with brown and barred with light purple. Pseudo-bulbs 2in. long, somewhat ovate, with long dark green obtuse leaves. Columbia, 1852. (I. H. 612.)

H. vittata (striped). A synonym of *Polycycnis vittata.*

HOUND'S TONGUE. *See* **Cynoglossum.**

HOUSELEEK. *See* **Sempervivum tectorum.**

HOUSTONIA (named after Dr. W. Houston, 1695-1733, a writer on American plants). ORD. *Rubiaceæ.* A genus comprising about twenty species of hardy herbaceous perennials, for the most part natives of North-western America. Flowers white, purple, or blue, dimorphous. Leaves opposite, broad or narrow. Houstonias are admirable little plants for growing between large stones on rockwork, where they will flower nearly all the year round. A compost of leaf soil and sand, rather moist, is most suitable. *H. cærulea* forms a pretty pot specimen under cold frame treatment, and may be used with good effect for surfacing the pots in which other hardy bare-stemmed plants are grown. Propagated by careful divisions, in autumn; or by seeds.

FIG. 242. HOUSTONIA CÆRULEA.

H. cærulea (blue).* Bluets. *fl.* usually elegant, light blue, sometimes white; peduncles one-flowered, elongated; corolla salver-shaped, ½in. across. Early summer. *l.* ovate-lanceolate, attenuated at the base; radical ones spathulate, a little hairy. Stem erect, dichotomous. *h.* 3in. to 4in. Virginia, 1785. See Fig. 242. (B. M. 370.)

H. longifolia (long-leaved). *fl.* pale lilac; stamens inclosed. August. *l.* linear-oblong; radical ones tapering at base and ciliated; stipules broad-ovate, entire or bi-tridentate. *h.* 6in. 1828. (B. M. 3099.)

H. serpyllifolia (Thyme-leaved).* *fl.* white; peduncles terminal, one-flowered, elongated. June to August. *l.* spathulate, rather hairy. *h.* 3in. 1826. (B. M. 2822.)

HOUTTEA (named in honour of the late Louis Van Houtte, a celebrated Belgian nurseryman). SYN. *Van Houttea.* ORD. *Gesneraceæ.* A genus comprising three species of stove shrubs, natives of Brazil. Flowers scarlet or spotted; corolla tube cylindrical. Leaves opposite, crenulate, pale or canescent-tomentose underneath. For culture, *see* **Gesnera.**

H. Gardneri (Gardner's).* *fl.* red; peduncles solitary, one-flowered, axillary; three calyx segments acuminate; corolla downy, tubular; perigynous ring five-lobed. July and August. *h.* 2ft. 1841. Plant glabrous. (B. M. 4121, under name of *Gesnera Gardneri.*)

H. pardina (leopard-spotted).* *fl.* orange, red; peduncles axillary, solitary, one-flowered; corolla with curved tube and spotted spreading limb; calyx segments large, spreading; stamens exserted. August to October. *l.* on short petioles, elliptic, thickish, serrate, glabrous above, tomentose beneath. *h.* 1½ft. 1847. Plant downy. (B. M. 4348, under name of *Gesnera pardina.*)

HOUTTUYNIA (named in honour of Houttuyn, the celebrated virtuoso of Amsterdam). Including *Gymnotheca.* SYNS. *Anemia, Anemiopsis,* and *Polypara.* ORD. *Piperaceæ.* A genus comprising two or three species of greenhouse perennial herbs, one of which is from California, another is broadly dispersed through the Himalayan region, China, and Japan, and a third is probably from China. Flowers hermaphrodite, spicate, sessile between the bracts; spikes terminal, pedunculate, dense. Leaves alternate, broad or oblong, often cordate at base; stipules large, membranaceous. The species succeed in any light rich soil, and in a moist situation. Increased by divisions, or by seeds.

H. californica (Californian). *fl.*, spadix short, erect, conical, clothed with hermaphrodite flowers without any perianth, but subtended by an involucre of about six oblong, spreading, white bracts, of which the inner three are spotted with red. Summer. *l.* nearly all radical, long-stalked, sub-cordate at base, obtuse, entire. Stem hairy, longer than the leaves. California. (B. M. 5292, under name of *Anemiopsis californica.*)

H. cordata (heart-shaped).* *fl.*, involucre resembling a corolla, of four white, ovate, spreading, elliptical leaflets, inserted immediately below the oblong spadix, which consists of several naked, closely-placed flowers; peduncle terminal, solitary, single-flowered. *l.* cordate-acuminate, alternate, entire, remote, glabrous, nerved, more or less deeply notched at the base. Stem erect, mostly simple, zigzag, glabrous. Japan. (B. M. 2731.)

HOVEA (named after A. P. Hove, a Polish botanist, and collector for Kew). SYN. *Poiretia.* ORD. *Leguminosæ.* A genus comprising eleven species of handsome ornamental greenhouse evergreen shrubs, confined to Australia. Flowers blue or purple, in axillary clusters or very short racemes, or rarely solitary; petals clawed; standard nearly orbicular, emarginate. Leaves alternate, simple, entire or prickly toothed, glabrous above, often tomentose underneath; stipules setaceous, minute or none. Propagation is best effected by seeds, which should be sown in well-drained pots of sandy-peat soil, in spring, and placed in a gentle bottom heat. Cuttings are rather difficult to strike. The seedlings must, when large enough, be potted off in similar soil, and grown on in an intermediate temperature, water being carefully administered, and the points pinched out when the plants are 2in. or 3in. high, to induce a bushy habit. After they become established, plenty of air may be admitted, and a cool greenhouse temperature will suffice. Hoveas are very distinct and desirable plants, on account of their intensely-coloured flowers, which appear in spring. *H. elliptica* is most commonly seen; it has rather a straggling habit, that requires to be corrected by pinching and training when the plants are young. *H. pungens* is smaller-growing, and more compact. The plants are sometimes attacked by Scale, which should be removed by sponging, or by an insecticide.

H. Celsii (Cels's). A synonym of *H. elliptica.*

H. chorizemifolia (Chorizema-leaved). *fl.* purple, rather small, on short pedicels. April. *l.* from ovate to lanceolate, pungent, pointed, sinuate and prickly-toothed, often undulate, coriaceous, reticulate and usually glabrous. *h.* 3ft. 1844. SYN. *Plagiolobium ilicifolium.* (B. R. 1524.)

H. elliptica (elliptic).* *fl.* beautiful deep blue; peduncles axillary, many-flowered. April to June. *l.* lanceolate, and somewhat rhomboid, bluntish, mucronate. Branches rather pilose. *h.* 2ft. to 4ft. 1818. SYN. *H. Celsii.* (B. M. 2005.)

Hovea—*continued.*

H. longifolia (long-leaved). *fl.* very shortly pedicellate, in axillary clusters, which sometimes grow out into interrupted spikes or racemes, or rarely solitary. July. *l.* oblong-lanceolate or linear, obtuse, with or without a small callous point, all under ¾in. long in some varieties, in others all above 2in., thickly coriaceous, with flat recurved or revolute margins. *h.* 8ft. to 10ft. 1805. The following forms, usually considered as distinct species, are, according to Bentham, merely varieties of above: *lanceolata* (*H. lanceolata*, B. M. 1624; *H. purpurea*, L. B. C. 1457); *normalis* (*H. longifolia*, B. R. 614; *H. racemulosa*, B. R. 1843, 4); and *pannosa* (*H. pannosa*, B. M. 3053; *H. purpurea*, B. R. 1423).

H. pungens (stinging).* *fl.* blue, one to three together on short pedicels. *l.* linear or lanceolate, ½in. to 1in. long, very spreading, rigidly coriaceous, with pungent points; margins much revolute. *h.* 1ft. to 2ft. 1837. (P. M. B. vi. 101, x. 51.)

HOVENIA (named after David Hoven, a senator of Amsterdam). ORD. *Rhamneæ*. A monotypic genus, the species being an ornamental greenhouse or half-hardy evergreen shrub, which thrives well in a sandy-loam soil. Ripened cuttings will root in sand, under a hand glass. The Hovenia proves hardy in the more southern parts of this country, if slightly protected in winter.

H. dulcis (sweet). *fl.* white, small, in axillary and terminal dichotomous panicles; peduncles sub-cylindrical, reflexed, smooth, 1in. long, thickening after flowering, containing a sweet red pulp. Summer. *l.* alternate, broad, cordate, serrated. *h.* 8ft. China, Japan, and the Himalayas, 1812. The plant from the Himalayas is frequently called *H. inæqualis*. (B. M. 2360.)

HOWARDIA. A synonym of **Pogonopus** (which *see*).

HOWEA (from Lord Howe's Island, where only the genus is found). Sometimes spelt *Howiea*. SYN. *Grisebachia*. ORD. *Palmeæ*. A genus comprising two species of stove palms. For culture, *see* **Kentia.**

H. Belmoreana (Belmore's).* Curly Palm. *fl.*, inflorescence of long and thick, simple, nodding or pendulous spikes; rachis with a triple spire of deeply-excavated notches, closely crowded, with raised margins. *fr.* oblong or ellipsoid, 1in. to 1½in. long; the pericarp hard in the dried state. *l.* 6ft. to 8ft. long, with numerous acuminate segments. Stems attaining 35ft. in height. SYNS. *Grisebachia Belmoreana, Kentia Belmoreana.*

H. Forsteriana (Forster's).* Flat or Thatch Leaf Palm. This closely resembles above in the male flowers and fruits; but the leaf segments are said to be always hanging, whilst in *H. Belmoreana* they are converged upwards. SYN. *Kentia Forsteriana.*

HOYA (named after Thomas Hoy, once gardener to the Duke of Northumberland, at Sion House). Honey Plant; Wax Flower. Including *Centrostemma, Cyrtoceras, Otostemma*, and *Pterostelma*. SYNS. *Schollia, Sperlingia*. ORD. *Asclepiadeæ*. A genus comprising about fifty species of very ornamental stove scandent or decumbent shrubs, natives of Western Asia, tropical and sub-tropical Australia, but found in the greatest abundance in the Malayan Archipelago. Flowers medium or large, rarely small; corolla rotate. Leaves opposite, fleshy or coriaceous. Hoyas are very interesting and beautiful plants, producing handsome wax-like flowers. Most of them succeed better in an intermediate temperature than where it is very hot. They are not so well adapted for training on rafters, or any dry surface, as on a wall, or in a position where more moisture is present, such as that of a warm greenhouse or stove. *H. carnosa* is a fine species, and the one most frequently grown. It sometimes becomes attached to a wall, like Ivy, and grows freely when planted out at the base. *H. bella* and *H. Paxtoni* are slender-growing plants, requiring a little more heat. They are well adapted for culture in hanging baskets, or over pieces of dead tree fern, placed in the middle of pans. Propagation is generally effected by cuttings, or by layers. *H. bella*, however, succeeds best when grafted on a stronger-growing sort than it does on its own roots. Cuttings should be taken in spring, or later in the year, from shoots of the preceding summer's growth, inserted in soil composed of peat and sand, and plunged in bottom heat, inside a frame or under a bell glass. A slight shade and careful watering will be necessary. When rooted, shift into larger pots, using soil of a similar description, and stop the points of the shoots when growth is resumed. For propagation by layering, good-sized pieces should have a few of their leaves removed,

Hoya—*continued.*

and be layered in pots of soil until rooted. The plants may afterwards be grown on and repotted, according to their strength, in various-sized pots, or any of the strong-growing species may be planted out in rather rough peaty soil, care being taken to render the drainage efficient. Hoyas do not require much shade, nor an atmosphere too closely confined. They should be allowed to rest in winter, by keeping rather drier and in a lower temperature. The flower stalks should not be cut off, as the flowers of the next year are produced on them, as well as on the young wood, when it is growing well. Sometimes, when plants attach themselves to a moist wall, they do well even if the roots in the soil die away. The species described below are climbers, except where otherwise stated.

H. australis (Southern).* *fl.* white, tinged with pink, with a Honeysuckle-like scent; disposed in deflexed umbels. October. *l.* obovate or sub-orbicular, coriaceous, deep green. Queensland and New South Wales, 1863. (B. M. 5820.)

H. bella (beautiful).* *fl.* waxy-white, with a rosy-crimson centre; umbels many-flowered. *l.* small, opposite, dark green on the upper side. *h.* 1½ft. India, 1847. (B. M. 4402.) *H. Paxtoni* closely resembles this in habit and appearance, but has less fleshy, more acuminate, and lighter green leaves, and pure white flowers with pink centres. Both species are of a dwarf, shrubby, slender habit, forming a drooping mass.

H. campanulata. *See* **Physostelma Wallichii.**

FIG. 243. FLOWERING STEM OF HOYA CARNOSA.

H. carnosa (fleshy).* Wax Flower. *fl.* pinkish-white; corolla fleshy, bearded inside; umbels pendulous, on short peduncles; pedicels pubescent. Summer. *l.* fleshy, oval-oblong, acuminated. Queensland, 1802. See Fig. 243. (B. M. 788, under name of *Asclepias carnosa*). There is a form of this species with variegated leaves. See Fig. 244.

H. cinnamomifolia (Cinnamon-leaved).* *fl.* large; corolla pale yellow-green; rotate segments broadly-ovate, acute; leaflets of the staminal crown deep purple blood-colour, ovate, acute, thick, fleshy. July. *l.* opposite, on short, very thick petioles, large, ovate, slightly peltate, acuminate, thick; three central nerves very conspicuous. Stem long, branched, twining. *h.* 10ft. Java, 1847. (B. M. 4347.)

H. coriacea (leathery). *fl.* brownish-yellow, produced in large umbels. Summer. *l.* ovate-acute, coriaceous, dark green. Manilla, 1838. (B. M. 4518.)

H. coronaria (crowned). *fl.* yellow. November. *l.* oval, acute, with recurved edges, coriaceous, villous beneath. Java, 1856. (B. M. 4969.)

Hoya—*continued.*

H. Cumingiana (Cuming's).* *fl.* greenish-yellow or white, with a coronet of rich purplish-brown; umbels axillary, short. Spring and summer. *l.* closely packed, flat, sessile, cordate, slightly downy beneath. Malay Archipelago. (B. M. 5148.)

H. globulosa (globular).* *fl.* pale straw or cream-colour, disposed in globose umbels; corona pink at base. April. *l.* oblong, coriaceous, rounded at the base, acuminate at the apex, more or less hairy. India, 1880. (G. C. n. s., xvii. 741.)

H. imperialis (imperial).* *fl.* reddish-brown, very large, about 3in. across, waxy; umbels 8in. to 9in. in diameter, and eight to ten-flowered. June. *l.* 6in. to 9in. long, slightly tomentose, light green. Borneo, 1847. A very noble plant. (B. M. 4397.)

H. lacunosa (furrowed). *fl.*, corolla greenish-yellow, rotate; inner surface covered with velvety hairs; peduncles interpetiolar, solitary, usually shorter than the leaves, bearing a flattened umbel of numerous flowers. March to June. *l.* opposite, elliptic-lanceolate, acuminated, marked above with a depressed midrib and a few horizontal depressed veins; petioles thick, short. Branches terete, throwing out roots from various points. Indian Archipelago, 1854. (B. M. 4826.)

H. l. pallidiflora (pale-flowered). *fl.* almost colourless. *l.* broader than in the type; nervation obsolete. Java. (B. M. 5272.)

FIG. 244. HOYA CARNOSA VARIEGATA.

H. linearis (linear).* *fl.* white, in a sessile, terminal, lax umbel. Autumn. *l.* shortly stalked, cylindrical, sub-acute, deeply grooved beneath, dark green. Himalaya. A charming plant, with slender pendulous branches, suitable for cultivation in hanging baskets.

H. multiflora. This is the correct name of the plant described in this work under the name of **Cyrtoceras multiflorum** (which *see*).

H. ovalifolia (oval-leaved). *fl.* bright yellow, with a red corona; produced in large umbels. Summer. *l.* fleshy, narrowly oval, about 6in. long, rolled back at the edges, dark green. India, 1840. (L. & P. F. G. 23.)

H. pallida (pale).* *fl.* pale yellow or straw-colour, with a pink corona; very fragrant, disposed in moderate-sized umbels. Summer. *l.* fleshy, ovate, dark green. India, 1815. (B. R. 951.)

H. Paxtoni. *See* **H. bella.**

H. Pottsii (Potts's).* *fl.* pale yellow, slightly downy, fragrant; corona rather purple in the centre; umbels globose. *l.* cordate, acuminated, with a rusty stain partly spread over them, pale whitish beneath. India, 1824. (B. M. 3425.)

H. purpureo-fusca (purplish-brown-flowered). *fl.* purplish-brown, produced in large umbels. September. *l.* ovate, slightly acuminate, fleshy, dark green. Java, 1849. (B. M. 4520.)

H. Shepherdi (Shepherd's).* *fl.* small; corolla delicate white and rose-colour; umbels about 2in. in diameter. June. *l.* 2in. to 6in. long, four lines wide, shortly acuminated at the apex, dark and channelled on the upper side, paler and semi-terete beneath; they are, as it were, geniculated at the apex of the short terete petiole, or bent down suddenly at an angle, and thus become pendent. *h.* 3ft. Sikkim-Himalaya and Khasia, 1860. A very remarkable plant. (B. M. 5269.)

H. trinervis (three-nerved). *fl.* pale greenish-yellow, slightly scented; corona whitish, with a yellowish tinge in the centre; umbels globose. Summer. *l.* variable in size, oblong, sharply acuminated, light yellowish-green above. China. 1824.

HUCKLEBERRY. *See* **Gaylussacia.**

HUDSONIA (named after William Hudson, 1730-1793, a London apothecary, and author of "Flora Anglica"). ORD. *Cistineæ.* A genus comprising three species of half-hardy evergreen shrubs, from North America. Flowers yellow, small, numerous, showy, crowded along the upper part of the branches. Leaves awl-shaped, scale-like, persistent, downy. The species thrive best in pots of well-drained peaty or sandy soil, but are rather difficult to cultivate. Propagated by layers; or by ripened cuttings, inserted in sand, under a hand glass.

H. ericoides (Heath-like).* *fl.* yellow; peduncles solitary, rising laterally from the leafy bud. May to July. *l.* filiform, awl-shaped, rather imbricated. Stems suffruticose. *h.* 1ft. Maine to Virginia, 1805. (L. B. C. 192; S. C. 36.)

H. tomentosa (tomentose). *fl.* yellow, sessile or short-peduncled. May and June. *l.* oval or narrowly-oblong, short, close-pressed and imbricated. *h.* 1ft. North America, 1826. Plant hoary with down. (S. C. 57.)

HUEGELIA. Now included under **Gilia** (which *see*).

HUERNIA (named after Justus Huernius, one of the earliest collectors of Cape plants). ORD. *Asclepiadeæ.* A genus comprising about eleven species of interesting greenhouse succulent plants, with the habit of *Stapelia,* from the Cape of Good Hope. Flowers large; corolla bell-shaped, five-fid, fleshy; corona double, outer one lobed, interior with five scales. For culture, *see* **Stapelia.**

H. barbata (bearded). *fl.* cream-coloured, variegated with elevated purple spots; disposed in fascicles at the base of the branches; peduncles two or three-flowered. August. Branches four or five-angled, with spreading, acute teeth. *h.* 6in. 1795. (B. M. 2401, under name of *Stapelia barbata.*)

H. brevirostris (short-beaked).* *fl.* yellowish, minutely spotted; tube pinkish-white, blood-red at bottom; peduncles four to six-flowered. Branches erect or ascending, four, or rarely five-angled. *h.* 6in. 1877. (B. M. 6379.)

H. campanulata (bell-shaped). *fl.* yellow; corolla campanulate, closed at bottom by clavate horizontal hairs; ligules spreading, truncate, dark. July to October. *h.* 6in. 1795. (B. M. 1227, under name of *Stapelia campanulata.*)

H. lentiginosa (freckled). *fl.* sulphur-colour, dotted with red; peduncles three-flowered. July. Branches pentagonal, spreading, furnished with hooked teeth or tubercles. *h.* 6in. 1795. (B. M. 506, under name of *Stapelia lentiginosa.*)

H. oculata (eyed).* *fl.*, corolla tube almost hemispherical, white inside; limb deep violet-purple; column short. Summer. Branches soft, pale green, five-angled, quite glabrous. *h.* 3in. to 4in. Dammara Land, 1880. (B. M. 6658.)

H. reticulata (netted). *fl.*, corolla with a purplish bottom; limb yellow, dotted with purple; twin or tern. August. Branches pentagonal, denticulated, sap-green, with purple spots. *h.* 6in. 1793. (B. M. 1662, under name of *Stapelia reticulata.*)

HUMATA. Included under **Davallia** (which *see*).

HUMBLE BEE (*Bombus terrestris, B. lucorum, &c.*). Humble Bees (see Fig. 245) have been known to damage Beans and cultivated flowers that have the nectar at the bottom of a long tube, by boring a hole in the calyx to obtain the nectar more easily. The flowers are not fertilised when robbed in this way, and the seeds become

FIG. 245. HUMBLE BEE.

abortive. Yet though this at times occurs, the damage done by it is so slight that the Bees ought to be regarded as useful allies, because of the services rendered by them in conveying pollen from flower to flower. There is reason to believe that certain plants, *e.g.*, Red Clover, are dependent on Humble Bees for their fertilisation. Should the

Humble Bee—*continued.*

Bees become really injurious, their numbers are most easily lessened by the destruction of their nests, which will be found under moss or stones, or in holes in the ground.

HUMBLE PLANT. *See* **Mimosa pudica.**

FIG. 246. HUMEA ELEGANS.

HUMEA (named after Lady Hume, once of Wormeleybury, Herts). SYNS. *Agathomeris, Calomeria.* ORD. *Compositæ.* A genus comprising four species of herbs or shrubs, limited to Australia. Flower-heads small and numerous, in a loose terminal panicle, or in compact corymbs. Leaves alternate, quite entire. The best-known and most frequently cultivated species is *H. elegans*, a very ornamental plant, when well grown, for greenhouse decoration or sub-tropical gardening. It is a biennial. The seed should be sown in July, in light, finely-sifted soil, and placed in any cool frame. When the plants appear, they should be potted, taking care not to injure the roots. Grow on in a frame or cool house, where plenty of light and air are available, and keep the roots nearly dry throughout the winter. In spring, gradually encourage growth, and pot on, placing into about 9in. pots as a final shift. The plants seldom succeed, unless very carefully treated in potting and watering. They do not like syringing, unless when growing strongly in warm weather. Being tender, they must not be planted outside before June, and must then be staked and protected from rough winds. A rich soil, composed of loam and decayed manure, with a little charcoal added, should be used, when potting, after the young plants are once established.

H. elegans (elegant).* *fl.-heads* brownish-red, pink, or crimson, minute, disposed in a large, loosely-branched, terminal, drooping panicle. July to October. *l.* large, oblong or lanceolate, clasping or decurrent at the base. *h.* 5ft. to 6ft. See Fig. 246.

HUMIFUSE. Spread over the surface of the ground.

HUMILIS. Low; when the stature of a plant is not particularly small, but much less than that of a kindred species.

HUMIRIACEÆ. A small natural order of balsam-bearing trees or shrubs, natives of tropical America. Flowers white, disposed in corymbose cymes, axillary, terminal or lateral. Leaves alternate, simple, entire or crenulate, coriaceous, exstipulate. There are three genera, and about twenty species. The genera are: *Humiria. Sacoglottis*, and *Vantanea.*

HUMULUS (from *humus*, the ground; plant prostrate if not supported). Hop. ORD. *Urticaceæ.* A genus containing a couple of species of ornamental hardy perennial twiners, of easy culture in ordinary garden soil, but thriving best in a deep loam. *H. Lupulus* is a vigorous and quick-growing plant; the second species is a native of China, Japan, &c. Propagated by seeds, or by divisions, in spring.

FIG. 247. PORTION OF FEMALE INFLORESCENCE OF HUMULUS LUPULUS.

H. Lupulus.* Common Hop. *fl.* greenish-yellow; males in loose axillary panicles; females in shortly-stalked, axillary, roundish spikes or heads. Summer. *l.* opposite, stalked, cordate, serrate, veined, rough. Stem branched, angular, rough. Temperate Europe (Britain), Asia, North America. There are several varieties, the best of which are the White Bines, the Goldings, and the Grapes. Hops are extensively grown both here and on the Continent, and in England alone some 50,000 acres of land are devoted to their culture. The heads of fruit are used in brewing, and the young blanched foliage is a good potherb. See Fig. 247. (Sy. En. B. 1284.)

HUMUS. The name given to the black substance that results from the decay of plants in the soil. Earth containing much Humus is often called Vegetable Mould or Black Earth, on account of its colour. This substance contains all the mineral compounds that existed in the living plants, but it chiefly consists of compounds of carbon, along with oxygen and hydrogen. Nitrogen, also, is present, chiefly in compounds of ammonia. Decaying organic matter becomes broken up into several acids (humic, ulmic, crenic, &c.), which have a great power of absorbing ammonia from the air, or from its less stable compounds in the soil, and of forming with it substances of greater permanence and more suited to yield the nourishment that plants require. Hence Humus, which is largely made up of these acids, acts an important part in storing up ammonia till required by plants; and there seems reason to believe that it may even cause the production of ammonia by decomposing water (H_2O), and setting free the hydrogen in it, in a state in which it readily combines with the nitrogen of the air to form ammonia (H_3N), which then combines with the organic acids in the soil. Humus absorbs water readily, yielding it up as the plants require moisture. It has also been suggested that it may be of value because of the carbonic acid (CO_2) formed in and emitted by it; but it is very doubtful whether the roots absorb that gas. It is certain, however, that the mineral compounds required by plants, and present in their decaying remains, are in a state better suited to be absorbed anew by growing plants than are the same compounds when derived only from the decomposition of rocks or inorganic soils. These properties explain why it is that Humus is beneficial to plant life, though, when present in excess, *e.g.*, in certain kinds of peat, it renders the soil swampy, acid, and unsuitable for the growth of plants, except of a few kinds, chiefly rushes, sedges, and some grasses, none of which are of any value in cultivation. The organic matter (so called because it is derived from the decay of organised beings, *i.e.*, of plants and animals) varies largely in amount in different soils. It is composed chiefly of Humus. In very poor soils, it may hardly be present at all. Good agricultural soils contain from 3 to 8 or 10 per cent. of it by weight. Old gardens, and other soils that have been long under careful cultivation (shown by their dark colour), may contain as much as 25 per cent.; and peaty soils may be almost entirely composed of it.

In the case of ordinary agricultural soils, if the produce is constantly removed, and none is returned to the soil, the Humus becomes exhausted, or so much diminished as no longer to supply the needs of the plants. Therefore, it is necessary to replace the missing substances as far as can be done; and this is most fully effected by the use of farmyard manure, in which is contained decaying organic matter fitted to restore the Humus that the crops have removed. Other manures are frequently employed to hasten the decay of plant remains in soil, and to increase the amount of Humus thereby; while others are added to supply only certain substances in which the soil is deficient, or to afford more stimulating food to plants than they could obtain from the soil for themselves.

HUNGARIAN LOTUS. *See* **Nymphæa thermalis.**

HUNNEMANNIA (named after J. Hunnemann, a zealous botanist, who died in 1837). ORD. *Papaveraceæ*. A monotypic genus, the species being a very showy, half-hardy, erect-growing perennial, with solitary, terminal flowers, and decompound, glaucous leaves. It requires a rich soil. Seeds should be sown in spring or autumn, in the open border, and protected during winter.

H. fumariæfolia (Fumaria-leaved). *fl.* yellow, like those of *Eschscholtzia californica*. July to October. *l.* decompound and triternate, glaucous; leaflets linear, blunt. *h.* 2ft. to 3ft. Mexico, 1827. (B. M. 3061.)

HUNTLEYA. Now included, by Bentham and Hooker, under **Zygopetalum** (which *see*).

HURA (its American name). Sand-box Tree. ORD. *Euphorbiaceæ*. A genus containing two or three species, natives of tropical America; one, *H. crepitans*, is a curious stove evergreen tree, commonly cultivated in most tropical countries. Huras thrive in a light loamy soil. Propagated by cuttings, inserted in sand, in heat, and covered with a bell glass.

H. crepitans (crackling). *fl.* reddish, inconspicuous, sterile and fertile on different plants. *fr.* rounded, hard-shelled, about the size of an orange; when ripe, and exposed to the action of a dry atmosphere, it bursts with a loud crack, whence the specific name. *l.* glossy, Poplar-like. *h.* 30ft. to 40ft. 1733. This tree abounds in a venomous milky juice.

HUTCHINSIA (named after Miss Hutchins, of Bantry, an accomplished cryptogamic botanist). ORD. *Cruciferæ*. A genus limited, by some authorities, to one species; by others, extended to a few allied ones from Southern Europe and Russian Asia, or also to two or three perennials from the high mountain ranges of Central and Southern Europe. The genus is nearly allied to *Iberis* and *Iberidella*. The species described below is a pretty little subject for the rock garden, or for margins or borders, in sandy soil. Propagated by divisions, or by seeds.

H. petræa (rock).* *fl.* very minute. Spring. *l.*, radical ones pinnate; stem ones with fewer and narrower segments. *h.* 3in. Central and Southern Europe (Britain). A glabrous, delicate, erect annual. (Sy. En. B. 151.)

HYACINTH. *See* **Hyacinthus.**

HYACINTHELLA. Included under **Hyacinthus** (which *see*).

HYACINTH, GRAPE. *See* **Muscari.**

HYACINTHUS (the ancient Greek name, used by Homer, for the Iris). Hyacinth. Including *Bellevallia*, *Hyacinthella*, and *Peribœa*. ORD. *Liliaceæ*. A genus containing about thirty species of tunicated bulbous plants, of which three are from tropical and Southern Africa, and all the rest natives of the Mediterranean region and the Orient. Flowers in simple, lax or dense racemes; perianth funnel or bell-shaped, with six sub-equal, spreading, erect or recurved lobes; scape leafless. Leaves all radical, linear or strap-shaped. The very numerous varieties that have originated from *H. orientalis* and *H. o. provincialis*, are esteemed some of the most popular and beautiful of spring-flowering plants for indoor and outdoor decoration. By forcing, and careful management in keeping a succession, Hyacinths may be had in flower nearly all the winter, and up till the end of May. Nearly all the supplies of new bulbs for this and several other countries are obtained from Holland. The soil there is sandy, and specially adapted, with the climate, to the cultivation of any quantity of bulbs. Propagation is effected by seeds for obtaining new varieties, and by offsets for perpetuating named or distinct kinds. Seeds are seldom sown in this country, as most of the new varieties are raised on the Continent. If required, they may be sown in light sandy soil, about September, covered with ½in. of similar soil, and protected throughout the winter. It usually takes from four to six years before they reach the flowering stage. Offsets should be removed soon after the old bulbs are taken up, and be planted out, about 2in. deep, in light soil. They generally flower the third year. For increasing a number of offsets of scarce varieties, the Dutch growers make one or two cross cuts half-way through healthy old bulbs, after taking them up. The following year, only a little growth is made above ground, but a quantity of young bulbs are formed beneath, which are afterwards separated, and planted in nursery beds. As the advantages possessed by the Dutch, in raising varieties and growing bulbs, are far superior to anything attainable in this country, nearly the whole of the trade is left to them, and the produce annually exported in immense

Hyacinthus—*continued.*

quantities. Hyacinths should be grown in pots for forcing and for exhibition; the single varieties succeed well in glasses of water, and are ornamental thus treated for room decoration. For a spring display in the open ground, Hyacinths are unexcelled, especially when arranged in flower beds, or anywhere in a mass.

The Roman Hyacinth. The early Roman Hyacinth is an extremely useful variety, with pure white flowers that may be had by November, as the bulbs arrive much earlier than those of the large-flowering sorts. Place three or four in a 5in. pot, just covering them with soil; afterwards water, and cover the whole up outside with about 6in. of ashes. When the pots become filled with roots, they should be taken into heat, and growth in the tops encouraged by frequent syringings. Some growers of this variety on a large scale, force the bulbs in boxes, and pot up just before coming into flower. This root disturbance does not injure the flowers much, when they are nearly fully developed; and the bulbs, so severely forced, are not of much further use. It is well to keep a portion of the stock for potting, along with the large-flowering sorts, as the early Roman is always much appreciated, and is far more useful for cutting, and for any decoration in winter.

Culture in Pots. Hyacinth bulbs should be secured as soon as possible after they arrive in autumn. The large-flowered varieties, which usually come over in September, should be potted singly in 5in. or 6in. pots, according to the size of bulb, and be covered with ashes in the same way as described above for the early Roman. The chief use of ashes is to keep the bulbs from rising when their new roots come in contact with the soil. A good potting compost is fibry loam and manure in about equal parts, with some river sand intermixed. The pots should be filled lightly, and the bulb pressed into the soil, so that its base is firmly fixed. This plan is much better than partially filling the pot and afterwards covering the bulb. Before subjecting any plants to heat, they should be well rooted, and the crowns just beginning to expand. The large-flowered varieties may be had in flower by the end of December, if they are potted early and carefully forced. Where a succession is the principal aim, rather than a large quantity at one time, it is best to divide the number of bulbs, and pot at intervals of about six weeks from August till the end of November. In winter, forcing should be conducted in a structure where all possible light is admitted; but, later in spring, any warm house will do, if not kept too much shaded. In March and April, the principal stock should be retarded, by placing them in a house or pit with a north aspect. Plenty of water should always be applied, and manure water is beneficial after the flower-spikes appear.

Culture in Glasses. Single varieties of Hyacinths are better adapted for culture in glasses than double ones. Special glasses are made, so that the bulb need not become submerged in the water. Soft rain-water should be used for filling them, a little charcoal placed in it, and some of the best bulbs selected. They should be inserted in moss, so that the base is just in contact with the water, and be then kept in a cool, dark place, until roots are emitted. A little additional water occasionally, and a light position, will be all they afterwards require until flowering.

Outside Culture. Hyacinths grown in the open ground need not be so large or choice as those cultivated under glass. They succeed best in light soil and in a sunny position. If the latter has been occupied by other plants throughout the summer, some manure should be added, and the soil well dug, before planting in October. For securing a display in flower beds in spring, the bulbs should be inserted about 9in. apart and 3in. deep, care being taken to place them all at an equal depth. They should be protected, if the weather is severe, especially

Hyacinthus—*continued.*

after the flower-shoots appear. If a covering of new cocoa-nut fibre is placed all over the bed before any of the flowers expand, it tends to heighten the effect they produce, and preserves them from being splashed by heavy storms. The bulbs, if left alone to ripen, or if lifted and dried slowly, may be used another year; but they generally deteriorate, and are not so good as others fresh imported. Any that are forced in pots are of little use afterwards, except for planting in mixed or shrubbery borders outside. Neat stakes are requisite for many varieties, to prevent the flowers being broken off by their own weight. The quality of Hyacinth bulbs for any purpose is a matter of material importance. Mere size is no criterion of quality, soundness and density being the chief points. If the bulbs are hard and heavy, in proportion to their size, the production of good flowers may be confidently expected.

H. amethystinus (amethystine-blue).* Spanish Hyacinth. *fl.* bright blue, drooping, unilateral or nearly so; spikes loose, four to twelve-flowered; bracts length of the pedicels. Spring. *l.* narrow, linear, as long as, or longer than, the flower-scape. *h.* 4in. to 12in. South Europe, 1759. (B. M. 2425.)

H. candicans (white). A synonym of *Galtonia candicans.*

H. corymbosus (corymbose).* *fl.*, perianth lilac-rose, ½in. long; segments erecto-patent; racemes clustered, four to nine-flowered;

FIG 248. HYACINTHUS ORIENTALIS.

Hyacinthus—*continued.*

pedicels erecto-patent; scape 2in. to 3in. long. Autumn. *l.* five or six, fleshy-herbaceous, semi-terete, 2in. to 4in. long, one line broad, pale green. Cape of Good Hope, 1793. (A. B. R. 345.) SYN. *Massonia corymbosa* (B. M. 991).

H. orientalis (Eastern).* Common Hyacinth. *fl.* fragrant, varying very much, clustered. Spring. *l.* lanceolate, grooved, dark green. *h.* 8in. to 12in. Syria, &c., 1596. See Fig. 248. (B. M. 937.) From this and its sub-species, *H. o. provincialis*, the various-coloured, full-spiked, single and double varieties of the garden Hyacinth have been produced.

H. o. albulus (small white).* This is the Roman Hyacinth of the bulb merchants, and is the most useful for very early forcing. It is of slender habit, with erect leaves, small racemes of white flowers with oblong segments, and the tube scarcely ventricose. Southern France.

H. o. provincialis (Provence) is a sub-species with more slender, green-channelled leaves, and slightly smaller, fewer-flowered racemes. South France, Switzerland, Italy.

H. romanus (Roman). *fl.* scentless; perianth white or pale blue; segments lanceolate, sub-acute; raceme twenty to thirty-flowered, 2in. to 3in. long and 1in. to 2in. broad when fully expanded; scape 6in. to 12in. long. May. *l.* four or five, erecto-patent, green, glabrous, fleshy-herbaceous, 1ft. to 1½ft. long, ½in. broad. Greece, Rome, &c. (B. M. 939, under name of *Scilla romana*.) The Roman Hyacinth of bulb-growers is **H. orientalis albulus** (which *see*).

H. spicatus (spicate). *fl.* six to twelve, densely sub-spicate; perianth bluish, obscure; segments erecto-patent, lanceolate; scape 1in. to 3in. long. February. *l.* six to eight, linear, fleshy-herbaceous, 3in. to 6in. long, 4in. broad, narrow at base. Greece, Crete, &c., 1826. (B. R. 1869.)

VARIETIES. These are extremely numerous, and are represented in pure white and in many shades of colour. The single-flowered varieties are most ornamental, and are cultivated much more largely than the double forms. Some of the latter are, however, very attractive, and produce large spikes, closely packed with small rosette-

FIG. 249. DOUBLE-FLOWERED VARIETY OF GARDEN HYACINTH.

like flowers (see Fig. 249), which are useful for wiring singly for buttonholes. The following list includes a selection of the best varieties in general cultivation. Variously-coloured varieties are sold in mixtures, unnamed, at a cheaper rate than named ones, and are very useful for growing in flower borders.

Hyacinthus—*continued.*

Single Black. CHRISTY MINSTREL, black, close spike, one of the best; GENERAL HAVELOCK, purple and black, handsome spike, fine exhibition variety; MASTERPIECE, black, fine spike, extra good; OTHELLO, purplish-black; PRINCE ALBERT, shining black, large compact spike; VON HUMBOLDT, purplish-black, long spike, good for exhibition.

Single Blue. ARGUS, bright blue with clear white centre, beautiful long spike, distinct; BLONDIN, bluish-purple externally, paler inside, fine large spike; CHARLES DICKENS, light blue, shaded lilac, one of the best in cultivation; DUKE OF CONNAUGHT, beautiful dark blue, handsome spike; GENERAL LAURISTON, dark blue, with light eye, large spike; GRAND LILAS, porcelain-blue, one of the best; KING OF THE BLUES, rich dark blue, large bells and magnificent spike, one of the best grown; LEONIDAS, clear blue, large and distinct; LORD DERBY, porcelain-blue, large spike; LORD MELVILLE, clear dark blue, white eye, distinct and good; LORD PALMERSTON, greyish-blue, white eye, fine bells and spike; LOTHAIR, bright blue, shaded mauve; MIMOSA, dark purple, fine and distinct; PRINCESS MARY OF CAMBRIDGE, pale porcelain, extra; SIR JOHN LAWRENCE, dark blue with white eye, bold and effective spike.

Single Lilac and Mauve. ADELINA PATTI, reddish-lilac, close spike, distinct; DE CANDOLLE, lilac and mauve, handsome spike, fine show variety; HAYDN, lilac-mauve, distinct and excellent; HONNEUR D'OVERVEEN, deep mauve, close spike, good; SAUNDERSON, violet-purple, one of the best for exhibition; SIR E. LANDSEER, dark reddish-lilac, close spike, extra fine.

Single Red and Pink. CAVAIGNAC, beautiful pink, deep rosy stripes, fine bells and spike, extra; DUCHESS OF RICHMOND, rich pink, fine spike; FLORENCE NIGHTINGALE, blush-rose, large bells, closely arranged; GARIBALDI, bright crimson, good spike, early; HOWARD, brick-red, close spike, distinct and good; LADY PALMERSTON, bright rose-pink, large close truss; LE PROPHÈTE, pale rose, marked with crimson, handsome spike; L'INCOMPARABLE, bright red, good; LINNÆUS, bright orange-crimson, close spike, extra fine; MACAULAY, rose with carmine stripes, good show variety; MADAME HODGSON, pale pink, well-formed spike, fine for glasses; NORMA, waxy-pink, very large bells, early and extra fine; PRIMA DONNA, rosy-red with light centre, handsome exhibition variety; PRINCE ALBERT VICTOR, rich bright crimson, large bells, and finely-arranged spike; PRINCESS CHARLOTTE, deep rose, white centre, large bells; ROBERT STEIGER, bright red, one of the best bedding or decorative sorts; VICTORIA ALEXANDRINA, deep red, extra fine and distinct; VON SCHILLER, salmon-pink with crimson stripes, fine show or decorative variety.

Single White. ALBA MAXIMA, pure white, very early, one of the best; ALBA SUPERBISSIMA, pure white, large and compact spike, good for bedding; BARONESS VAN TUYLL, pure white, long handsome spike, early; GRANDEUR À MERVEILLE, pale blush, large bells, close handsome spike; GRAND VAINQUEUR, pure white, very early; GRAND VEDETTE, white, large bells and very long spike; LA GRANDESSE, pure white, long and handsome spike, one of the best for exhibition; LA NEIGE, white, one of the earliest; L'INNOCENCE, pure white, large bells and magnificent spike; LORD SHAFTESBURY, pure white, extra large spike; MADAME VAN DER HOOP, purest white, extra large, good spike; MONT BLANC, pure white, long spike, fine show variety; QUEEN OF THE NETHERLANDS, white, handsome spike, extra; SNOWBALL, pure white, extra large bells, immense spike.

Single Yellow. BIRD OF PARADISE, clear yellow, long spike, excellent variety; GRAND DUC DE LUXEMBOURG, clear primrose-yellow, good spike; IDA, beautiful primrose-yellow, large bells, compact spike, extra fine; LA CITRONIÈRE, pale yellow, good; L'OR D'AUSTRALIE, clear yellow, extra fine; PRIMROSE PERFECTION, primrose-yellow, splendid spike, fine for exhibition.

Double Blue. BLOCKSBERG, porcelain, large bells, and good spike; GARRICK, light blue, shaded, good; LAURENS KOSTER, dark blue, close handsome spike, one of the best double varieties; LOUIS PHILIPPE, bright blue, striped, extra fine; MAGNIFICENCE, light blue, large bells, and fine spike; REMBRANDT, rich dark blue, large bells, distinct, and good.

Double Red. GROOTVORST, fine delicate blush, early; KOH-I-NOOR, pale red, semi-double, long spike; LORD WELLINGTON, pale rose, large bells and handsome spike, good show variety; MILTON, deep red, large compact spike, extra; SUSANNA MARIA, bright rose, large handsome spike; WATERLOO, or BOUQUET TENDRE, deep red, good spike, very early.

Double White. ANNA MARIA, blush, with purple centre, good spike; COMTESSE DE ST. BRIEST, creamy-white, large; JENNY LIND, white with purple centre, distinct; LA TOUR D'AUVERGNE, pure white, long spike, one of the best; PRINCE OF WATERLOO, pure white, large handsome spike, extra fine; SCEPTRE D'OR, pure white, yellowish centre, good.

Double Yellow. BOUQUET D'ORANGE, reddish-yellow, medium spike; GOËTHE, pale yellow, good; JAUNE SUPRÊME, pure citron-yellow, very double; LA GRANDEUR, citron, fine spike; OPHIR D'OR, deep yellow, extra; WILLIAM III., fine yellow, good spike.

HYÆNACHNE. A synonym of **Toxicodendron** (which *see*).

HYALINE. Crystalline; transparent, or nearly so.

HYBERNALIS. Of, or belonging to, winter.

HYBERNIA. This is a genus of slender-bodied moths, which are frequently destructive, as larvæ, to the foliage of trees and shrubs. In all species, the female is almost wingless, while the male has wings from 1¼in. to 1½in. in spread. The males have the antennæ more or less pectinated. In colour they are all some shade of brown, often verging to reddish, with darker bars crossing the front wings. Their larvæ belong to the group of Loopers; they are slender, and are always inconspicuous (shades of green or brown) in colour. The moths emerge between October and March, and the females crawl on to the food-plants to lay their eggs. *H. leucophæaria* (Spring Usher) lives on Oak; *H. rupicapraria* (Early) on Hawthorn, Oak, &c.; *H. aurantiaria* (Scarce Umber) on Hawthorn; *H. defoliaria* (Mottled Umber, see Fig. 250) on Oak, Hawthorn, Blackthorn, Hazel, and many other trees. The pupæ of all the species lie in the ground near the trees off which the larvæ have dropped: hence, an occasional dressing of gas-lime around the trunk, from October onwards, will be beneficial; but care is required, to avoid injuring the tree. To prevent the ascent of females to lay their eggs, various applications to the trunks of the trees have been recommended, *e.g.*, cart-grease and Stockholm tar, in equal parts; or a rope dipped in a mixture of tar and oil, and tied round the trunk. The larvæ may be cleared off by shaking the branches over cloths spread on the earth around the trees. Care must be taken to remove those hanging by threads, as well as those that have dropped on to the cloths.

FIG. 250. HYBERNIA DEFOLIARIA (MOTTLED UMBER MOTH), showing Male, Female, and Larva.

HYBRID. A cross between two species.

HYBRIDISING. Most of the so-called Florists' Flowers have been brought up to their present standard of excellence by careful and systematic Hybridisation. The mere operation is easy enough; it is simply necessary to convey the pollen, by means of a camel-hair brush, or otherwise, from the male parent, and place it on the stigmatic surface of the flower of the female, or seed-bearer. Of course, unless the latter is receptive, this proceeding would be ineffective. As a rule, when it is fit to be acted upon by the pollen, the stigma becomes more or less glutinous; in some plants, this condition occurs before their own anthers are ready to discharge the pollen, and in others after the pollen has been shed.

Hybridising—*continued.*

In both these cases, the arrangement is evidently to prevent self-fertilisation. Not a few plants, however, develop stigma and anthers at the same time, and with them it is necessary to remove the anthers before they burst, and, at the same time, by means of fine gauze or otherwise, to prevent the visits of insects, which might convey pollen from another flower, and thus effect an undesirable cross. Continuously working with pollen of certain flowers not unfrequently conduces to sterility, and then a fresh strain must be used, possessing one or more of the qualities it is wished to perpetuate and improve. For instance, a flower of good form, but defective in colour, is, perhaps, crossed with another which is faulty in shape, but of a novel and desirable shade. A weakly-growing variety, of good habit, may be used with effect in combination with a stronger grower lacking the particular qualities present in the former. Sometimes, the florist's ideal has been kept so constantly in sight, that the pollen of a particular strain becomes more or less abortive. More than one very successful raiser of Cyclamens and Gladioli habitually call in the aid of the microscope to determine the state of the pollen in highly-bred seedlings. If this is uneven—not plump, clean and regular—in size and outline, the plant is discarded as a male parent, and another chosen (with perfect pollen) which promises to attain the desired results in size, form, or colour of flower.

Hybrids between two distinct genera are by no means common. A good example is *Philageria* (a cross between the beautiful climbing *Lapageria rosea* and the bushy *Philesia buxifolia*), which is intermediate in character between its two parents, though not nearly so desirable as either. Species of the same genus frequently refuse altogether to cross with each other, and some, again, will only cross one way. No definite rules can be laid down, and exceptions can only be learned by experience.

The following remarks, anent double flowers, are taken from a lecture by the Hon. Marshall P. Wilder, delivered before the Massachusetts Horticultural Society, some thirteen years ago. The gentleman in question is a well-known and very successful hybridiser. "In my experiments, I have discovered that, for the production of double flowers, it is important that the pollen used for impregnation should be borne on a petaloid anther—that is, an anther bearing a small petal—and that this is still better if from a double flower. I also observed, that the larger and better developed this petaloid anther, the better chance for a fine double offspring; for, as might have been expected, the anthers being connected with the corolla, the number of petals would be increased by such an operation. I found, also, that, for the most perfect and symmetrical flowers, it was better to select single flowers, which were the most perfect in their petals, for seed-bearers; and that single or semi-double sorts with perfect corollas, when impregnated with petaloid pollen, will produce double flowers of a regular symmetrical formation. Of this I have the most conclusive evidence in the *Camellia Wilderi*, and many other fine double varieties in my collection, which were produced from the single red and single white Camellias, fertilised by pollen from a petaloid anther of double varieties."

HYDNUM (from *Hydnon*, the old Greek name used by Theophrastus for the Truffle). A genus of about 200 species of hymenomycetous fungi, varying greatly in size and substance, but all distinguished by the fructifying surface (hymenium) consisting of prickles projecting from the cap (pileus). The species are found in all climates, but are most frequent in temperate regions. *H. repandum* (see Fig. 251) is not uncommon in Britain; it occurs in woods, in scattered patches or large rings, and, if properly cooked, affords an excellent article of food. The specimens, which must be perfectly fresh, after being

Hydnum—*continued.*

sliced into hot water, and gently pressed, should be carefully stewed, or rubbed down into a purée.

FIG. 251. HYDNUM REPANDUM.

HYDRANGEA (from *hydor*, water, and *aggeion*, a vessel; in allusion to the cup-shaped fruit). SYN. *Hortensia*. ORD. *Saxifrageæ*. A genus consisting of thirty-three species of greenhouse or hardy, deciduous or evergreen, showy shrubs or trees, natives of Eastern Asia, Java, the Himalayan Mountains, North-west and South-east America. Petals four or five; calyx superior, five-toothed; stamens eight to ten; capsule membranaceous. Leaves opposite, petiolate, persistent or deciduous, entire, serrate, or lobed. Hydrangeas are of easy culture, and are exceedingly ornamental for conservatory, room, or window decoration. They are also well adapted for growing in the open ground, in all the warmer parts of the country. The sorts having abortive or sterile flowers, with an enlarged calyx, are the most ornamental, and are extensively grown. *H. hortensis*, and some of its varieties, have nearly all sterile flowers, and are, consequently, most popular. *H. paniculata grandiflora* is very handsome, and amongst the best, either for pot culture or for outside treatment. The American species are hardier, but not so ornamental, as those from China and Japan. Propagation is readily effected from cuttings of young or partially-ripened shoots, which may be inserted at almost any time when they are procurable. Old plants may also be divided for propagation. For culture outside, a somewhat sheltered position should be selected, except in favourable localities.

Cultivation in Pots. Hydrangeas may be propagated annually to produce one head of flowers each—a method largely practised—or they may be grown as shrubby plants several years in succession. Cuttings should be inserted in small single pots, and plunged in a close, warm frame. They may be taken in spring, from young growths that are not bearing flowers, and be grown on throughout the summer, and well ripened in autumn by exposure outside. Another plan is to let the old plants grow all the season, and put in strong points as cuttings when partially ripened. In this case, the formation of roots only should be encouraged, by plunging in a little bottom heat, but not in an inclosed frame. Select the tops of the strongest and most prominent shoots for cuttings, and insert them in August. When they are rooted, gradually harden off, and expose them to full sunshine and plenty of air in autumn, to insure thorough ripening. When the leaves fade, water should be withheld, and the plants kept dry, in a cool greenhouse, all the winter. In February, or earlier if desired, they may be potted into 5in. or 6in. pots, and started by placing in a higher temperature, and applying more water. The embryo buds, formed the previous autumn, will soon begin to expand; but it is not usual for all

Hydrangea—*continued.*

to flower, as they may not have been sufficiently strong. As a rule, the corymb of flowers appears after the fourth pair of leaves; and should the plant develop so far without the embryo being seen, it may be thrown away, unless required for another year. Late autumn-struck cuttings produce useful dwarf-flowering plants in spring, not exceeding 1ft. in height. Those propagated in spring, and grown on in pots for the next year, are much stronger and taller in proportion. A new stock should be propagated annually, and the old ones thrown away, unless required for bush specimens or for supplying cuttings, when they may be cut down, repotted, and grown on in pots, or be planted out in the open air. Hydrangeas like a rich soil, such as loam and decayed cow or other manure in equal parts. Any quantity of water may be applied in the growing season; and artificial manure, given just as the flowers are developing, invariably proves beneficial. The flowers sometimes turn blue, certain soils having the property of changing the normal colour, in consequence of the presence of some chemical constituent. Water, in which alum has been dissolved, is used artificially to cause the same change in colour. Iron in small quantity, as well as some other substances, mixed with the soil, are said to produce the same effect. In some gardens, plants that produce red flowers one year may develop blue ones the next, and this without any influence or skill on the part of the cultivator.

H. arborescens (tree-like). *fl.* white, small, having an agreeable odour, nearly all fertile; corymbs flattish. Summer. *l.* ovate, rather cordate; upper ones lanceolate, coarsely toothed, pale and puberulous beneath. *h.* 4ft. to 6ft. North America, 1736. Hardy. (B. M. 437.)

FIG. 252. HYDRANGEA HORTENSIS.

H. hortensis (garden).* Common Hydrangea. *fl.* varying much in colour (according to the soil in which the plant is grown), disposed in ample corymbs or cymes, all difformed; fertile flowers few. April to September. *l.* broadly-ovate, serrated, acuminated. *h.* 2ft. to 3ft. China, 1790. SYN. *Hortensia opuloides*. See Fig. 252. The varieties of this species are numerous; one of the most noteworthy being "Thomas Hogg," a form with pure white flowers.

H. h. japonica (Japanese). *fl.* blue, white, difformed; cymes crowded. *l.* ovate-oblong, acuminated, finely and glandularly serrated, glabrous. *h.* 3ft. Japan, 1843. The variety *roseo-alba* has the outer flowers only radiate, and either white or rosy toothed petals; and *cærulescens* has bright blue ray-flowers. There are also forms having leaves with gold and silver variegation.

Hydrangea—*continued.*

H. h. Otaksa (Otaksa).* *fl.* flesh-coloured, nearly all sterile, disposed in large, terminal, globose, leafless cymes. *l.* opposite, cuneate-obovate, deeply serrated. *h.* 2½ft. Japan, 1868. Hardy.

H. h. stellata prolifera (prolíferous star-like). *fl.* at first yellowish-green, ultimately rose-colour, sterile; cyme terminal, densely packed. Japan, 1868.

H. h. variegata (variegated) is a variety with very ornamental foliage, particularly when grown as young plants, in heat.

FIG. 253. HYDRANGEA PANICULATA GRANDIFLORA, showing Habit and detached Single Flower.

H. paniculata grandiflora (large-flowered panicled).* *fl.* white, disposed in a large, terminal, leafy panicle, 1ft. long, consisting of openly-arranged, small, star-shaped flowers, intermixed throughout with sterile ones, more than 1in. across. Summer and autumn. *l.* opposite, or in threes, ovate-oblong, acute, pubescent. Japan, 1874. Hardy. See Fig. 253.

H. petiolaris (petiolar).* *fl.* white, in flat-topped cymes, 8in. to 10in. in diameter; fertile flowers greenish, very numerous; stamens fifteen to twenty. April and May. *l.* broadly ovate-cordate, acuminate, finely serrate, dark green above, paler beneath; stalk pubescent, and nerves bearded in axils. Trunk slender, branching, rooting like Ivy against its support. Japan, 1876. Cool conservatory. (B. M. 6788.) Now and then met with in gardens under the name of *Schizophragma hydrangeoides*, a very different plant.

H. quercifolia (Oak-leaved).* *fl.* white, sterile, or outer ones large; corymbs rather panicled, flattish. Summer. *l.* large, ovate, sinuately lobed and toothed, pilose beneath. *h.* 4ft. to 6ft. Florida, 1803. Half-hardy or greenhouse. (B. M. 975.)

H. scandens (climbing). *fl.* white; petals cohering at their tips and falling together. Japan, 1879. Plant climbing, half-hardy.

H. Thunbergii (Thunberg's).* *fl.* blue or rose; the sterile ones on the circumference, and fertile ones in the centre, of the cyme; cymes terminal, 3in. to 4in. in diameter. *l.* opposite, petiolate, ovate-oblong, acute, serrulate. *h.* 2ft. to 3ft. Japan, 1874. Half-hardy. (G. C. 1870, 1699.)

HYDRANGEÆ. A tribe of *Saxifrageæ.*

HYDRASTIS (probably from *hydor*, water, and *drao*, to act; in allusion to the active properties of the juice). ORD. *Ranunculaceæ.* A monotypic genus, the species being a hardy herbaceous perennial. It is of somewhat difficult culture, and must be grown in loam and leaf mould, in a moist situation. Increased by divisions of the root.

H. canadense (Canadian). Orange Root. *fl.* greenish-white, small, solitary; petals none. May and June. *l.* rounded, heart-shaped at the base, five to seven-lobed, doubly serrate, veiny; when full grown, in summer, 4in. to 9in. wide. Stem simple, hairy. *h.* 1ft. North America, 1759. (B. M. 3019, 3232.)

HYDRIASTELE (from *hydria*, a water vessel or fountain, and *stele*, a column; in allusion to the tall stems growing near springs). ORD. *Palmeæ.* A monotypic genus, the species being a tall stove palm. For culture, *see* **Kentia.**

H. Wendlandiana (Wendland's). *fl.*, panicle of numerous slender pendulous spikes of about 1ft., the common peduncle very short, broad, and thick, marked with the scars of the spathes and of two outer bracts; spathe and male flowers unknown; female perianth under the fruit, the segments all very broad, the inner twice as long as the outer ones. *fr.* ovoid or globular, when dry longitudinally striate with prominent ribs, succulent when fresh, with a thin endocarp. *l.* many feet long; segments numerous, unequal, the longest 1½ft. long, the upper ones confluent at the base, all or mostly jagged or toothed at the apex. Tropical Australia. SYN. *Kentia Wendlandiana.*

HYDROCHARIDEÆ. A small order of aquatic herbs, widely diffused over the globe. Flowers in spathes, often incomplete; perianth of six segments, the three inner often petaloid. Leaves undivided, floating or submerged, opposite or whorled. There are about fourteen genera and forty species. Examples: *Hydrocharis, Ottelia, Stratiotes, Vallisneria.*

HYDROCHARIS (from *hydor*, water, and *charis*, grace; a pretty water plant). ORD. *Hydrocharideæ.* A monotypic native aquatic genus, spread over Europe and North Asia. The species thrives in any still water. It may be readily increased by seeds; or by runners, which root at the joints.

H. Morsus-ranæ (Frogbit). *fl.* rather large; outer segments of perianth pale green, shorter and narrower than the inner white ones; peduncles of male plant rather short, bearing two or three flowers; pedicel of female enlarged at top into a short perianth tube. Summer. *l.* stalked, orbicular, entire, cordate at base, rather thick, about 2in. in diameter. Stems floating, with floating tufts of leaves, peduncles, and fibrous roots. (Sy. En. B. 1444.)

HYDROLEA (from *hydor*, water, and *elaia*, oil; alluding to the habitat and nature of the plants). SYNS. *Reichelia, Sagonea, Steris.* ORD. *Hydrophyllaceæ.* A genus comprising about fourteen species of herbs or sub-shrubs, inhabiting North and South America, tropical

FIG. 254. FLOWERING STEM OF HYDROLEA SPINOSA.

Africa, the West Indies, the Malayan Archipelago, and tropical Australia. Flowers blue, axillary or terminal; corolla broadly campanulate-rotate, five-fid; lobes imbricated. Leaves alternate, entire. The species require damp, boggy positions to thrive thoroughly.

Hydrolea—*continued.*

H. caroliniana (Carolina). *fl.* blue, one to five together, axillary, almost sessile. Summer. *l.* lanceolate, very acute, 1in. to 3in. long. *h.* 1ft. to 2ft. North Carolina, 1824. SYN. *H. quadrivalvis.*

H. corymbosa (corymbose). *fl.* blue, in a terminal corymbose cyme; sepals linear-lanceolate, villous-hispid. Summer. *l.* lanceolate, nearly sessile, glabrous. *h.* 1ft. to 2ft. South Carolina to Florida.

H. quadrivalvis (four-valved). A synonym of *H. caroliniana.*

H. spinosa (thorny). *fl.* pale blue, terminal, corymbose. June and July. *l.* lanceolate. *h.* 1ft. South America, 1791. See Fig. 254. (B. R. 566.)

HYDROLEÆ. A tribe of *Hydrophyllaceæ.*

HYDROMESTUS. Now included under *Aphelandra.*

HYDROPELTIS (from *hydros*, water, and *pelte*, a buckler; the plant grows in water, and has leaves in the form of a buckler). ORD. *Nymphæaceæ.* A very pretty little hardy aquatic plant, which should be grown in a pond or a cistern of water. Increased by offsets.

H. purpurea (purple). *fl.* purple, closing and lying down on the surface of the water at night; peduncles axillary, one-flowered. Summer. *l.* alternate, on long petioles, oval, peltate, entire, floating. North America, 1798. The correct name of this plant is *Brasenia peltata.* (B. M. 1147.)

HYDROPHYLLACEÆ. A small order of annual or perennial herbs, rarely suffrutescent, natives, for the most part, of North-west America. Flowers chiefly blue or white, in one-sided cymes or racemes, which are mostly bractless and coiled from the apex when young, as in the Borage family. Leaves usually alternate, entire, dentate, or pinnate, hispid. There are sixteen genera and 150 species. Illustrative genera are: *Emmenanthe, Hydrolea, Hydrophyllum, Nemophila, Phacelia.*

HYDROPHYLLUM (from *hydor*, water, and *phyllon*, a leaf; leaves loaded with water in spring time). ORD. *Hydrophyllaceæ.* This genus comprises about six species of erect or diffuse hardy perennial herbs, natives of North America. Flowers white or pale blue, in cymose clusters; corolla bell-shaped, five-cleft. Leaves ample. The species thrive in any ordinary border, in somewhat damp soil. Propagated by divisions, or by seeds.

H. appendiculatum (appendiculate). *fl.* blue; cymes rather loosely-flowered. June and July. *l.*, stem ones palmately five-lobed, rounded, the lobes toothed and pointed; the lowest pinnately divided. *h.* 9in. 1812.

H. canadense (Canadian). *fl.* nearly white, crowded, on very short pedicels; calyx lobes linear-awl-shaped, nearly smooth. June to August. *l.* palmately five to seven-lobed, rounded, heart-shaped at the base, unequally toothed. *h.* 1ft. 1759. (B. R. 242.)

H. virginicum (Virginian). *fl.* blue; calyx lobes narrowly-linear, bristly-ciliate. June to August. *l.* pinnately divided; divisions five to seven, ovate-lanceolate or oblong, pointed, sharply cut-toothed, the lowest mostly two-parted, the uppermost confluent. *h.* 1ft. to 2ft. 1739. (B. R. 331.)

HYDROTÆNIA. A synonym of **Tigridia** (which *see*).

HYEMALIS. Of or belonging to winter. The term is usually applied to plants which flower in winter.

HYGROMETER. For horticultural purposes, the best instrument for ascertaining the degree of humidity in the air is the Dry and Wet Bulb Thermometer. This consists simply of a couple of fine tubes, carefully graduated, containing mercury. The bulb of the one should be covered with thin muslin; and round the neck, and over the muslin, should be twisted loosely, or tied in a loose knot, a conducting thread of lamp wick or some similar material: this must pass into a vessel of water, about 3in. from the bulb, and a little on one side, so that evaporation may not affect the reading of the dry bulb by its too near vicinity. The Hygrometer just described is less complicated and expensive than those in which the dew-point is ascertained by the use of ether, &c.; and, moreover, it allows of continuous observations. Hygrometrical tables, adapted to the use of the Dry and Wet Bulb Thermometer, have been compiled by James Glaisher, F.R.S., and published in pamphlet form.

HYGROMETRICAL. Indicating the approach of moisture.

HYMENÆA (from *Hymen*, the god of marriage; referring to the twin leaflets). Locust-tree. ORD. *Leguminosæ.* A genus comprising eight species of ornamental stove evergreen trees, natives of tropical America. Flowers white, large or medium. Leaves bifoliolate; leaflets coriaceous. Hymenæas will thrive in a compost of peat and rich loam. Firm cuttings will root, during spring, in sand, in bottom heat. The only species yet cultivated is the one here described.

H. Courbaril (Courbaril). Anime Resin. *fl.* yellow, striped with purple. *l.* oblong-ovate, unequal-sided, and unequal at the base, ending in a long acumen. *h.* 40ft. to 60ft. South America, 1688. This tree furnishes a valuable resin, and its timber is of a fine brown colour, hard, and close-grained; it is used for building and other purposes in its native country.

HYMENANDRA (from *hymen*, a membrane, and *aner, andros*, a man; the anthers are connected by a membrane). ORD. *Myrsineæ.* A monotypic genus, the species being a stout evergreen shrub, often cultivated in stoves for the sake of its handsome foliage. For culture, *see* **Ardisia** (to which the genus is allied).

H. Wallichii (Wallich's). *fl.* pink, disposed in compound lateral umbels; corollas wheel-shaped, five-parted. *l.* large, leathery, glossy, dentate, pellucid-dotted. *h.* 2ft. to 4ft. Western Bengal and Assam.

HYMENANTHERA (from *hymen*, a membrane, and *anther*; anthers terminated by a membrane). SYN. *Solenantha.* ORD. *Violarieæ.* A genus comprising about four species of greenhouse or half-hardy evergreen rigid shrubs or small trees, natives of Australia and New Zealand. Flowers small, axillary, frequently polygamous. Leaves alternate, often clustered, small, entire or toothed, without stipules. The species thrive in two parts sandy peat, and one of fibry loam. Young cuttings root readily in sand, under a bell glass.

H. crassifolia (thick-leaved). *fl.* yellowish, small; pedicels solitary, axillary. Berries white, ¼in. long, oblong-obtuse, very ornamental. *l.* alternate or tufted, linear-spathulate, entire. *h.* 2ft. to 4ft. New Zealand, 1875. Hardy in the South of England. (G. C. n. s., iii. 237.)

H. dentata (toothed). *fl.* yellow, small, axillary; peduncles solitary, one-flowered. April. *l.* from oblong-elliptical to linear, obtuse or acute, coriaceous, sessile or narrowed into a short petiole. *h.* 6ft. New South Wales, 1824. (B. M. 3163.)

HYMENOCALLIS (from *hymen*, a membrane, and *kallos*, beauty; referring to the membranous cup inside the flower). Including *Choretis* and *Ismene.* ORD. *Amaryllideæ.* A genus containing about a score species of stove or greenhouse bulbous-rooted plants, from North and South America and the West Indies. Flowers white, in umbels, very fragrant; perianth tube straight, elongated, scarcely widened at the throat. Leaves usually persistent, lorate. Many species usually classed in gardens under this genus are Pancratiums. The stove species require a strong, loamy soil, well drained, and a liberal allowance of pot-room. The bulbs should be buried just below the surface of the soil, and they must always be kept moist, more especially during the summer. The best of the stove kinds is *H. macrostephana*, which is as useful and beautiful as the Eucharis. The greenhouse species thrive under the above treatment, except that during their resting period (winter) they should be kept dry. A few kinds, which are known in gardens as Ismenes, may be grown in the open border, if sheltered from cold winds, and well drained; but it is only in very favoured situations, in England, that these plants prove satisfactory when grown altogether out of doors. They may, however, be planted out during the summer, and be taken up, and placed in sand, in a shed or frame, for the winter.

H. adnata (adhering-leaved). *fl.* white, with narrow perianth segments, and a deep wavy corona; disposed in umbels. May. *l.* rather broad. *h.* 1ft. South America, 1758. The variety *littoralis* is a handsome greenhouse plant, with pure white flowers

Hymenocallis—*continued.*

3in. to 4in. long, and resembling a Giant Trumpet Narcissus. (B. M. 2621.)

H. Amancaes (Amancaes). *fl.*, corolla bright yellow, large, nutant, salver-shaped; tube green downwards, yellow upwards; segments linear-lanceolate, narrow, distant, stellately expanded; scape compressed, ancipital, even. *l.* reticulately veined, downwards fistularly sheathing for about half the length of the scape. *h.* about 2ft. Chili and Peru. Greenhouse. (B. M. 1224, under name of *Pancratium amancæs.*)

H. amœna (charming).* *fl.* sweet-scented; tube green-white, remainder of the flower white. October. *l.* six to eight, 10in. long, paler beneath, with a thick fleshy midrib. *h.* 1ft. to 2ft. Guiana, 1790. Stove. (B. M. 1467, under name of *Pancratium amœnum.*)

FIG. 255. HYMENOCALLIS ANDREANA.

H. Andreana (André's). *fl.* white, on slender one-flowered scapes, shorter than the leaves; perianth tube green, cylindrical, erect, 4½in. to 5in. long, curved at the top; limb white; segments linear, 3½in. to 4in. long; corona broadly funnel-shaped, nearly 3in. long, 3in. to 4in. at the throat, with green stripes. *l.* linear, pale green, glabrous. *h.* 1½ft. Ecuador, 1876. See Fig. 255. (R. H. 1884, 468; Gn. xxv. 454, under name of *Ismene Andreana.*)

H. Borskiana (Borski's). *fl.* white, with a very thin transparent corona, seven in an umbel. April. *l.* dull green, 2½ft. long. *h.* 1ft. La Guayra, 1845. Stove.

H. calathinum (basket-flowered).* *fl.* white, exceedingly fragrant, about 3in. long, expanding in succession with intervals of from ten to fourteen days; tube and upper part of style green. March and April. *l.* fistularly sheathing, few, two-ranked, striate-nerved, obtuse. Brazil, 1796. Greenhouse. (B. M. 1561, under name of *Pancratium calathinum.*)

H. Choretis (Choretis). *fl.*, tube long, green; limb white; corona white, rotate, with a jagged border; scape three-flowered August. *l.* strap shaped, erect, glaucous, about 2½in. wide and 6in. long. *h.* 1ft. Mexico, 1837. Stove. SYN. *Choretis glauca.*

H. expansa (expanded). *fl.* sessile, obsoletely three-cornered, pale green, 4½in. long; segments linear. November. *l.* linear-lanceolate, striated. *h.* 2ft. Native country unknown. Stove. (B. M. 1941, under name of *Pancratium expansum.*)

H. Harrisiana (Harris's). *fl.* white; tube very long and slender, surmounted by six very narrow-linear white segments, and with a cup-shaped corona from whose border project six green stamens at equal distances; umbels few-flowered. June. *l.* sessile. *h.* 1ft. Mexico, 1838. Greenhouse. (B. M. 6562.)

H. Macleana (McLean's). *fl.* white; perianth yellowish, marked with green; tube slender; limb and style exceeding the corona. June. *l.* broad, arching, deep green. *h.* 2ft. Lima, 1837. Greenhouse, nearly hardy. For an account of this plant and its allies, and their uses by the Peruvians, see Stewart's "Visit to the South Seas," or the long extract from that work given in the "Botanical Magazine," lxv. (B. M. 3675, under name of *Ismene Macleana.*)

H. macrostephana (large-crowned).* *fl.* white, with a green tube, about 3in. long, sweet-scented; umbel six to eight-flowered. February. *l.* broad-lanceolate, 2½ft. to 3ft. long. *h.* 2ft. 1879. Stove. (B. M. 6436.)

Hymenocallis—*continued.*

H. rotata (rotate). *fl.* white; segments of perianth linear-lanceolate; corona spreading, closely toothed; scape two-edged, ten to twelve-flowered, longer than the leaves. May. *l.* linear-oblong, streaked. *h.* 1½ft. Florida, 1803. Greenhouse. (B. M. 827, under name of *Pancratium rotatum.*)

H. speciosa (showy).* *fl.* pure white, very fragrant, especially in the evening; scape shorter than the leaves, compressed, ancipital. *l.* very dark green, from 1½ft. to 2ft. long, and from 3in. to 4in. across the broadest part. West Indies, 1759. A very desirable stove plant. (B. M. 1453, under name of *Pancratium speciosum.*)

H. tenuifolia (narrow-leaved). *fl.* white; corona large, funnel-shaped, nearly as long as the linear perianth segments; scape two-edged, one-flowered. June. *l.* linear. *h.* 9in. Ecuador, 1878. A beautiful greenhouse species. (B. M. 6397, under name of *Ismene tenuifolia.*)

H. virescens (greenish). *fl.* greenish; tube of perianth about equal to the segments; sepals and petals ovate. June to August. *l.* green, rather erect, acute, sheathing at the base. *h.* 1ft. Cusco, 1840. Greenhouse. (B. R. 1841, 12, under name of *Ismene virescens.*)

HYMENODES. Membranous in texture.

HYMENODICTYON (from *hymen*, a membrane, and *dictyon*, a net; seeds girded by a reticulated membrane). SYN. *Kurria.* ORD. *Rubiaceæ.* A genus comprising four or five species of stove trees, natives of Asia and tropical Africa. Flowers small, racemosely panicled. Leaves opposite, petiolate, glabrous or pubescent, deciduous. For culture, *see* **Cinchona.**

H. excelsum (tall). *fl.*, panicles axillary and terminal, large. Summer. *l.* oblong and downy; floral ones coloured and blistered. *h.* 30ft. India, 1820. The bark of this species is very astringent, and is largely used for tanning purposes. (B. F. S. 219A, under name of *H. utile.*)

HYMENODIUM CRINITUM. A synonym of **Acrostichum crinitum.**

HYMENOLEPIS. Included under *Acrostichum.*

HYMENOPHYLLUM (from *hymen*, a membrane, and *phyllon*, a leaf). Filmy Fern. ORD. *Filices.* A genus of about eighty species of stove or greenhouse, rarely hardy, ferns. Fronds delicately membranaceous, simple or compound, never with anastomosing veins. Sori marginal, more or less sunk in the frond, or exserted; involucre inferior, more or less deeply two-lipped or two-valved, toothed or fringed, or entire; receptacle elongated, columnar, exserted or included. Except where otherwise stated, the species described below require stove treatment. For culture, *see* **Ferns.**

H. abruptum (abrupt). *sti.* about ¼in. long, very slender. *fronds* ½in. to 1in. long, ¼in. to ½in. broad, oblong, pinnatifid nearly to rachis; pinnæ linear, about ¼in. long. *sori* one or two to a frond, terminal on the apex. West Indies and tropical America, 1859. (H. S. F. i. 31.)

H. æruginosum (verdigris-covered).* *sti.* 1in. to 2in. long, hairy. *fronds* 2in. to 3in. long, about, or scarcely 1in. broad, lanceolate or ovate-acuminate, tripinnatifid; pinnæ often much imbricated, the lower ones flabellate, divided down nearly to the rachis; surface and margin pubescent. *sori* two to twelve, terminal on the segments. Tristan d'Acunha.

H. asplenioides (Asplenium-like). *sti.* 1in. to 2in. long, slender. *fronds* 2in. to 4in. long, ¼in. to 1in. broad, pendulous, oblong in general outline, pinnatifid nearly to rachis. *sori* one to four, terminal on the segments. Tropical America, 1859.

H. bivalve (two-valved). *sti.* 2in. to 4in. long, wiry. *fronds* ovate-triangular, tripinnatifid, 3in. to 8in. long, 2in. to 3in. broad; lower pinnæ triangular-acuminate; ultimate segments linear, two to three lines long, spinuloso-dentate. *sori* very numerous, often six to eight on a single pinnule. New Zealand. (H. S. F. i. 35D.)

H. Boryanum (Bory's). A synonym of *H. ciliatum.*

Hymenophyllum—*continued.*

H. caudiculatum (tailed). *sti.* 4in. to 6in. long, wiry, broadly winged above. *fronds* 6in. to 12in. long, 2in. to 3in. broad, ovate-acuminate, tripinnatifid; lower pinnæ rhomboidal-lanceolate, erecto-patent, divided down to the rachis. *sori* two to twelve to a pinna, placed at the apex of the segments on both sides. Brazil, Peru, and Chili.

H. ciliatum (ciliated).* *sti.* 1in. to 2in. long, ciliately and decurrently winged above. *fronds* oblong, acuminate, tripinnatifid, 2in. to 6in. long, 1in. to 2in. broad at the centre; lower pinnæ oblong or rhomboidal, with a broad central undivided portion. *sori* two to twelve on a pinna, placed at the end of the lateral segments on both sides. Tropical regions of both hemispheres, 1859. SYN. *H. Boryanum, H. Plumieri.*

H. crispatum (curled). A synonym of *H. javanicum.*

H. demissum (hanging down).* *sti.* 4in. to 6in. long, erect, firm. *fronds* 4in. to 12in. long, 3in. to 4in. broad, ovate-triangular, three or four times pinnatifid; lower pinnæ 2in. to 3in. long, triangular-rhomboidal, divided nearly to the rachis. *sori* twenty to thirty to a pinna, terminal and axillary in the segments on both sides. New Zealand, Philippines, &c., 1858. Greenhouse.

H. dilatum (swollen). *sti.* 2in. to 4in. long, erect, wiry. *fronds* 6in. to 12in. long, 4in. to 6in. broad, ovate-lanceolate, tripinnatifid; lower pinnæ rhomboidal-lanceolate, divided nearly to the rachis. *sori* two to twelve to a pinna, terminal or axillary on the segments on both sides. New Zealand. Greenhouse.

FIG. 256. HYMENOPHYLLUM FALKLANDICUM.

H. falklandicum (Falkland Islands). *sti.* ½in. to ⅔in. long, filiform. *fronds* oblong, pinnatifid, 1in. to 2in. long, ⅔in. to ¾in. broad; pinnæ erecto-patent, sessile, upper simple, lower deeply bifid or trifid; lobes ciliate-dentate. *sori* solitary. Falkland Islands. Greenhouse. See Fig. 256.

H. fimbriatum (fringed). A synonym of *H. javanicum.*

H. flabellatum (fan-like). *sti.* 2in. to 4in. long, firm, erect. *fronds* 4in. to 12in. long, 2in. to 4in. broad, ovate-acuminate, tripinnatifid, flaccid; lower pinnæ 1in. to 2in. long, broadly rhomboidal-acuminate, divided to the rachis. *sori* six to twenty to a pinna, terminal on the lateral segments. Australia, New Zealand, &c., 1859. Greenhouse. SYN. *H. nitens.*

H. flexuosum (flexuous). A synonym of *H. javanicum.*

H. hirsutum (hairy).* *sti.* 1in. to 2in. long, slender. *fronds* linear-oblong, once pinnatifid, 2in. to 6in. long, about ½in. broad, slender, flaccid, often pendulous, hairy over the surface; pinnæ short, close. *sori* one to four on a pinna. South America, Madagascar, 1823.

H. hirtellum (small-haired). *sti.* 1in. to 4in. long, tomentose. *fronds* ovate-acuminate, tripinnatifid, 3in. to 6in. long, 2in. to 3in. broad; lower pinnæ rhomboidal-lanceolate, with a narrow central undivided portion; lower pinnules pinnatifid, with long, narrow-linear ciliated segments. *sori* two to twelve to a pinna, placed at the end of the lateral segments on both sides. West Indies, Mexico, &c., 1859. (H. S. F. i. 31D.)

H. javanicum (Javanese). *sti.* 2in. to 4in. long, erect, margined above with a broad crisped wing. *fronds* 4in. to 8in. long, 3in. to 4in. broad, triangular, tripinnatifid; lower pinnæ 1½in. to 2in. long, triangular-rhomboidal, divided down to a narrow crisped centre. *sori* six to twenty to a pinna, terminal and axillary on the segments on both sides. India to Australia, &c. Greenhouse. SYNS. *H. crispatum, H. fimbriatum* (H. S. F. i. 36), *H. flexuosum.*

Hymenophyllum—*continued.*

H. nitens (shining). A synonym of *H. flabellatum.*

H. Plumieri (Plumier's). A synonym of *H. ciliatum.*

FIG. 257. HYMENOPHYLLUM TUNBRIDGENSE.

H. polyanthos (many-flowered).* *sti.* 2in. to 3in. long, slender. *fronds* 2in. to 8in. long, 1in. to 3in. broad, ovate-oblong, tripinnatifid; lower pinnæ triangular-rhomboidal, divided down to a narrow centre. *sori* two to twelve to a pinna, terminal or axillary on the segments of both sides. Tropics, 1824. SYN. *H. protrusum.* (H. S. F. i. 37B.)

H. protrusum (protruded). A synonym of *H. polyanthos.*

H. pulcherrimum (very pretty).* *sti.* 3in. to 4in. long, wiry, erect, winged down to the base. *fronds* 6in. to 12in. long, 4in. to 6in. broad, ovate-triangular, three or four-pinnatifid; lower pinnæ 2in. to 3in. long, lanceolate-rhomboid. *sori* numerous, axillary and terminal on the segments of both sides. New Zealand. Greenhouse.

FIG. 258. HYMENOPHYLLUM UNILATERALE, showing Habit, and detached Pinna with Involucre.

H. rarum (rare). *sti.* very slender, 1in. to 3in. long. *fronds* flaccid, pendent, 2in. to 6in. long, 1in. to 2in. broad, oblong, bipinnatifid; pinnæ simple, linear or forked or pinnatifid. *sori* large, terminal on the segments of the upper pinnæ. New Zealand to Cape Colony. Greenhouse.

Hymenophyllum—*continued.*

H. scabrum (rough). *sti.* 2in. to 4in. long, wiry, ciliated. *fronds* 6in. to 15in. long, 2in. to 5in. broad, ovate-acuminate, tripinnatifid; lower pinnæ 2in. to 3in. long, oblong-rhomboidal, acuminate, divided nearly to the rachis. *sori* six to twenty to a pinna, terminal on the lateral segments on both sides. New Zealand, 1859. Greenhouse.

H. sericeum (silky). *sti.* 2in. to 4in. long, wiry. *fronds* pendent, 6in. to 24in. long, 2in. to 3in. broad, elongate-oblong, obtuse or acuminate, simply pinnatifid; pinnæ 1in. to 2in. long, numerous, opposite, very variable in division. *sori* numerous to a pinna, small, terminal on the apex of the pinnæ and lateral segments. Tropical America, 1859.

H. tunbridgense (Tunbridge).* *sti.* ½in. to 1½in. long. *fronds* oblong-lanceolate, 1in. to 3in. long, ½in. to 1in. broad, pinnate throughout; pinnæ distichous, flabellato-pinnatifid; lobes linear, one to three lines long, spinulose, serrated, as is also the compound involucre. Temperate regions (Britain). Hardy. See Fig. 257.

H. unilaterale (one-sided) This differs from *H. tunbridgense* in the more ovoid and turgid involucre, in the darker green and more rigid fronds, with the pinnæ pinnatifid on the upper side chiefly. Britain. See Fig. 258. Hardy. SYN. *H. Wilsoni.*

H. Wilsoni (Wilson's). A synonym of *H. unilaterale.*

HYMENOPTERA. A large and most important order of insects, distinguished by the possession of four membranous naked wings, supported by a network of nervures, and of a mouth furnished with jaws for biting. They undergo a complete metamorphosis, their larvæ being usually like maggots, without feet, but with a distinct head; their pupæ are inclosed in a cocoon, and are helpless, but the limbs lie free from the body, not adherent to it, as in the Lepidoptera. The insects are seldom of large size, but they are very numerous, and of very varied habits. The more important groups to horticulturists are the following: 1. Sawflies, or *Tenthredinidæ.* In these, the female has a saw to bore a secure place for depositing the eggs in leaves or branches. The larvæ feed on plants, and have six horny legs, and often several fleshy legs, or prolegs, behind, so that they often resemble larvæ of moths. In the perfect insects, the abdomen and the thorax are closely joined, without any distinct stalk between them. Some of them make true galls on leaves and twigs of Willows. 2. In this class the females possess an ovipositor, and the abdomen is fixed to the thorax by a distinct stalk. The larvæ are footless, and, except in one group, are parasitic in or on other insects: hence they are frequently beneficial. In this section are included the very abundant groups of the Ichneumons and the Chalcides, both parasitic, and the Gall-flies (*Cynipidæ*), which are, in part, makers of true galls on Oaks, Roses, &c., and in part parasites. 3. The Sting-bearers (or Aculeate Hymenoptera). In these, the females usually possess a sting connected with a poison-gland, which they use as a weapon of defence. The antennæ are simple, and are formed of thirteen joints in the males, and of twelve in the females. The larvæ are footless, and are usually supplied with food brought by the perfect insects. The habits of the members of this section are extremely various. Some are solitary, and dig or build cells for the reception of their eggs, which they surround with food for the larvæ—either honey or pollen, or small insects, stung, so as to remain helpless, though alive, till eaten by the larvæ. Among these are the Solitary Wasps and Solitary Bees. Others live in societies (Honey Bees, Humble Bees, Wasps, and Ants), often very numerous, and with a very complex organisation. Often, in a community, there are perfect males, perfect females, and undeveloped females or workers, also called neuters. The workers do the work of the rest, and some may even be modified specially as soldiers, to fight in defence of the community. The Bees are of special importance to many plants, because of the great part they play in securing the fertilisation of flowers, and thereby insuring the production of the seed. *See* **Galls, Honey Bee, Humble Bee, Ichneumon Flies,** and **Sawflies.**

HYMENOSTACHYS. Included under **Trichomanes** (which *see*).

HYOPHORBE (from *hys, hyos,* a hog, and *phorbe,* food; probably on account of the fruits being eaten by pigs). ORD. *Palmæ.* A genus of three species of ornamental, middle-sized stove palms, natives of the Mascarene Islands. Flowers white, dicœcious, produced in spikes. Berries one-seeded, olive-like. Leaves terminal, pinnate. Trunk unarmed. For culture, *see* **Areca.**

H. amaricaulis (bitter-stemmed).* *l.* pinnate, erect when young, ultimately spreading from 4ft. to 6ft. in length; pinnæ stout, broad, closely set together, about 2in. broad, acuminated. Trunk and petioles very stout, deep maroon, glaucous, with an orange line extending along the outer edges of the midrib. Mauritius, 1866. SYN. *Areca speciosa.* (I. H. 462, 3.)

H. Commersoniana (Commerson's). A synonym of *Chrysalidocarpus lutescens.*

H. indica (Indian). A synonym of *Chrysalidocarpus lutescens.*

FIG. 259. HYOPHORBE VERSCHAFFELTII.

H. Verschaffeltii (Verschaffelt's).* *l.* pinnate, 4ft. to 6ft. long, nearly erect, gracefully arching at the top; pinnæ linear-lanceolate, acuminate, 1½ft. to 2ft. long, 1in. broad; midribs white. Sheath of the leaves forming a triangular columnar stem. Rodriquez. A splendid species. See Fig. 259. (G. C. 1870, 418.)

HYOSCYAMUS (from *Hyos Kyamos* (Hog's Bean), the ancient Greek name used by Hippocrates). Henbane. ORD. *Solanaceæ.* A genus comprising about nine species of biennial or perennial erect herbs, inhabiting warm and temperate Europe, Africa, and Asia. Corolla obliquely campanulate or shortly funnel-shaped, five-lobed. Capsule inclosed in the enlarged calyx, bursting when ripe round a circular raised ring, immediately below the hardened top. The species are of no particular horticultural value, and the only one worth including, chiefly for its medicinal properties, is *H. niger.*

H. niger (black). *fl.* very shortly stalked; corolla pale dingy yellow, with purplish veins. Summer. *l.* rather large, sessile; the upper ones stem-clasping, ovate, and regularly pinnatifid. *h.* 1ft. to 2ft. Europe (Britain), North Africa, North and West Asia, India. (B. M. Pl. 194.)

HYOSPATHE (from *hys, hyos,* a hog, and *spathe*; it is known in Brazil as Hog's Palm). ORD. *Palmæ.* A genus comprising three species of reed-like, unarmed, stove palms, natives of Brazil. Flowers green, minute;

Hyospathe—*continued.*

spadices two or three, shortly pedunculate ; spathes two, lower one compressed, two-keeled; upper one fusiform. Leaves few, terminal, irregularly pinnatisect; segments broad. The species best known is *H. elegans*. For culture, *see* **Bactris.**

H. elegans (elegant). *fl.*, spikes produced below the leaves, and bear both male and female flowers. *fr.* violet, resembling an olive in shape. *l.* 3ft. to 4ft. long, nearly entire when young, having only a division at the point, but when full-grown they are more or less divided, and become irregularly pinnate. Para. The leaves of this plant are employed for thatching.

HYPECOUM (from *hypecoon*, the old Greek name used by Dioscorides). Including *Chiazospermum*. SYN. *Mnemosilla*. ORD. *Papaveraceæ*. A genus of four (or perhaps five) species of glaucous hardy annual herbs, natives of Southern Europe, Northern Africa, and temperate Asia. Hypecoums thrive in any ordinary garden soil. Propagated by seeds, sown in the open border, in spring, for summer flowering; or in autumn for early spring flowering. The species best known to cultivation is *H. procumbens*.

H. procumbens (procumbent). *fl.* bright yellow ; scapes several, erect when in flower, but becoming procumbent when in fruit. Spring and summer. Pods flat, falcate, taper-pointed. *l.* glaucous, smooth ; radical ones several, petiolate, pinnately multipartite ; leaflets bipinnatifid ; stem leaves with shorter footstalks and less divided. *h.* 1ft. South Europe, 1596. (S. B. F. G. 217.)

HYPERANTHERA. A synonym of **Moringa** (which *see*).

HYPERICINEÆ. An order of herbs, shrubs, or rarely trees, comprising eight genera and 210 species, generally distributed over the world, both in temperate and warm climates. Flowers usually yellow or white, terminal, panicled or in dichotomous cymes, rarely axillary; sepals five, rarely four, imbricate; petals the same, hypogynous, imbricate, often twisted. Leaves opposite or rarely whorled, simple, penninerved, entire, or with glandular teeth, usually sprinkled with pellucid glands sunk in the parenchyma, and edged with vesicular black glands. Many of the species yield a yellow juice and an essential oil; some are purgative, others tonic and astringent. Illustrative genera are : *Ascyrum*, *Haronga*, and *Hypericum*.

HYPERICOPSIS. Included under **Frankenia** (which *see*).

HYPERICUM (the old Greek name, used by Dioscorides). Including *Androsæmum*, *Elodea* (of Spach), *Sarothra*, and *Tridia*. ORD. *Hypericineæ*. A genus comprising 160 species of greenhouse or hardy, evergreen or deciduous herbs, shrubs, or sub-shrubs, broadly dispersed over the whole world, but particularly abundant in Southern Europe, Western Asia, and North America. Flowers usually yellow, variously disposed, but rarely umbellate. Leaves opposite, sessile or sub-sessile, usually full of pellucid and black dots on their edges. All the species are of simple culture in almost any ordinary garden soil, but a sandy loam is generally preferable. A winter top-dressing for the more ornamental perennial sorts will be found of great advantage. Propagation may be quickly effected by seeds, by cuttings, or by strong pieces of the creeping-rooted species. Flowers yellow, and plants deciduous, except where otherwise stated.

H. ægyptiacum (Egyptian). *fl.* small, few, almost sessile. June. *l.* glaucous, small, ovate, crowded, dotless. Stem round. *h.* 6in. to 18in. North Africa and Levant, 1787. Half-hardy evergreen. (B. M. 6481.)

H. Androsæmum (Androsæmum). Sweet Amber; Common Tutsan. *fl.* large, terminal, stalked. Summer. *l.* sessile, ovate, sub-cordate, minutely dotted. *h.* 3ft. Europe (Britain). Sub-shrubby. See Fig. 260.

H. Ascyron (Ascyron). St. Peter's Wort. *fl.* very large, few. July. *l.* stem-clasping, lanceolate, acute, full of pellucid dots. Stem tetragonal, simple. *h.* 3ft. Siberia, 1774. Hardy perennial.

H. balearicum (Balearic).* *fl.* large, few. March to September. *l.* ovate, obtuse, rather stem-clasping. Stem quadrangular,

Hypericum—*continued.*

warted. *h.* 1ft. to 2ft. Majorca, 1714. Greenhouse evergreen shrub. (B. M. 137.)

H. calycinum (large-calyxed).* Aaron's Beard; Rose of Sharon. *fl.* large, terminal, solitary. Summer. *l.* ovate, coriaceous, broad, full of pellucid dots. Stem tetragonal, dwarf. *h.* 1ft. South-east Europe (naturalised in Britain). One of the handsomest shrubs; nearly evergreen. (B. M. 146.)

H. Coris (Coris-leaved). *fl.* about ¾in. across. May to September. *l.* in whorls, linear, with revolute margins. Stem shrubby, erect, round. *h.* 6in. to 24in. Levant, 1640. Half-hardy evergreen. (B. M. 6563.)

H. elatum (tall). *fl.* corymbose; peduncles bibracteate. July. *l.* ovate-oblong, acute, dilated at the base, somewhat emarginate, with the margins rather revolute. Young stems reddish. *h.* 5ft. North America, 1762. Hardy shrub. (Sy. En. B. 265.)

H. elegans (elegant).* *fl.* racemose. Summer. *l.* ovate-lanceolate, rather stem-clasping, bluntish, full of pellucid dots. Stem erect, winged, full of black dots. *h.* 1ft. Siberia, 1817. An elegant hardy perennial.

H. elodes (marshy). *fl.* pale yellow, with green ribs, expanding in the sun only; panicle loose, few-flowered. Summer. *l.* roundish-ovate, blunt, shaggy, tomentose, full of pellucid dots. Stem villous, round, procumbent. West Europe (Britain), Azores. A very pretty herbaceous plant for boggy places. (Sy. En. B. 276.)

FIG. 260. HYPERICUM ANDROSÆMUM, showing Habit and detached Flower.

H. empetrifolium (Empetrum-leaved).* *fl.*, petals without glands. Summer. *l.* linear, tern, with revolute margins. Stem suffruticose, with slender, erect, four-angled branchlets. *h.* 6in. to 12in. South Europe, 1820. Half-hardy evergreen. (B. M. 6764.)

H. hircinum (goat-scented). Goat-scented St. John's Wort. *fl.* large, few ; peduncles bibracteate ; styles very long. Summer. *l.* somewhat emarginate at the base, dilated, sessile, ovate-lanceolate, with glandular margins. Branches winged. *h.* 2ft. to 4ft. Mediterranean region, 1640. Hardy shrub. (Sy. En. B. 266.)

H. Hookerianum (Hooker's).* *fl.* few, large. Summer. *l.* elliptical-lanceolate, crowded, with the margins a little revolute, full of fine pellucid dots. Stem round, shrubby. *h.* 2ft. Nepaul, 1523. Half-hardy evergreen. (B. M. 4949, under name of *H. oblongifolium*.)

H. japonicum (Japanese). *fl.* solitary, loosely panicled, small; peduncles solitary or tern. Spring. *l.* broad-ovate or oval, mucronate, obtuse, with revolute edges, full of pellucid dots. Stem weak, tetragonal, smooth, decumbent. *h.* 1ft. Japan, 1823. Hardy perennial.

H. Kalmianum (Kalm's). *fl.* three to seven in a terminal corymb. June. *l.* linear-lanceolate. Branches tetragonal. *h.* 2ft. to 4ft. North America, 1759. Hardy shrub.

H. nummularium (Moneywort-leaved). *fl.* racemose. Summer. *l.* orbicular, stalked. Stem round, ascending. *h.* 3in. to 6in. Pyrenees, &c., 1823. Hardy perennial.

H. oblongifolium (oblong-leaved). A synonym of *H. Hookerianum*.

Hypericum—*continued.*

H. olympicum (Olympian). *fl.* large, few; peduncles bibracteate. Summer. *l.* elliptical-lanceolate, rather acute, full of pellucid dots, glaucous. Stem round, shrubby. *h.* 1ft. to 2ft. Mount Olympus, 1706. Greenhouse evergreen.

H. orientale (Eastern). *fl.* appearing in summer. *l.* stem-clasping, linear, obtuse, erect, fringed with glandular hairs. Stem shrubby, slender, with two angles, erect and jointed. *h.* 6in. to 12in. Levant. Half-hardy perennial.

H. patulum (spreading).* *fl.* corymbose; peduncles bibracteate. Summer. *l.* ovate-lanceolate, acute, tapering to the base, with revolute margins, without dots. Stem round, purplish, herbaceous. *h.* 6ft. Japan. Hardy. (B. M. 5693.)

FIG. 261. DEHISCING CAPSULE AND PORTION OF INFLORESCENCE OF HYPERICUM PERFORATUM.

H. perforatum (perforated).* Common Hypericum; St. John's Wort. *fl.* bright yellow, in a handsome terminal corymb; sepals lanceolate, pointed, quite entire, but with a few glandular lines or dots; petals marked with black dots. Summer and autumn. *l.* sessile, oblong, marked with pellucid dots and occasionally a few black ones on the under side. *h.* 1ft. to 3ft. Temperate regions of Northern hemisphere (Britain). Hardy perennial. See Fig. 261. (Sy. En. B. 268.)

H. prolificum (prolific). *fl.* few, corymbose. Summer. *l.* linear-lanceolate, with revolute edges, full of pellucid dots. Stem round, shrubby; branches angular. *h.* 1ft. to 2ft. North America, 1758. Hardy.

H. pyramidatum (pyramidal). *fl.* few, large; peduncles short, thick. Summer. *l.* stem-clasping, oblong-lanceolate, acute, with revolute margins. Stem winged, herbaceous. *h.* 4ft. North America, 1764. Hardy.

H. triflorum (three-flowered). *fl.* solitary; peduncles terminal, usually in threes. Summer. *l.* membranous, ovate-oblong, bluntish, full of pellucid dots. Stems terete, shrubby. Mountains of Java. Half-hardy. (Gn. xxiii. 158.)

H. uralum (Urala). *fl.* terminal, somewhat corymbose. Summer. *l.* elliptical, mucronulate, smooth, shining. Branches compressed, two-edged. *h.* 2ft. Nepaul. Hardy shrub. (B. M. 2375.)

HYPHÆNE (from *hyphaino*, to entwine; alluding to the fibres of the fruit). Doom, Doum, or Gingerbread Palm. ORD. *Palmæ*. A genus of about nine species of fan-leaved stove palms, natives of tropical Africa, Arabia, and the Mascarene Islands. Flowers dicœcious; males in twos, females solitary. Leaves terminal, orbicular, or nearly so, with sword-shaped acute or bifid segments. Stems unarmed, tall or of medium height, simple or

Hyphæne—*continued.*

dichotomously branched. Probably the only species in cultivation is *H. thebaica*, a plant which is difficult to cultivate. It thrives best in rich sandy loam, and may be increased by imported seeds.

H. thebaica (Theban). *l.* large, fan-shaped, in a terminal tuft, whence arises the branched inflorescence. Stem branched, each branch ending in a tuft of leaves. *h.* 40ft. Upper Egypt and Nubia, 1828. The wood of this tree is extremely hard, and is employed in the manufacture of various domestic utensils. (F. d. S. 2152-3.)

HYPOCALYMMA (from *hypo*, under, and *kalymma*, a veil; calyx falling off like a veil or cape). ORD. *Myrtaceæ*. A genus containing twelve species of ornamental greenhouse evergreen shrubs, limited to Western Australia. Flowers axillary, in pairs, or rarely three or four together in each axil, sessile or shortly pedunculate, with three scarious bracts or bracteoles under each flower. Leaves opposite, usually larger than in *Bœckea*, entire, or with crisped edges. The species require a compost of loam and peat, to which a little sand is added. Cuttings of young shoots will root in sand, under a bell glass. Probably the two species here described are the only ones yet introduced.

H. angustifolium (narrow-leaved). *fl.* white or pale pink, in sessile pairs, but often in the axil of one only of each pair of leaves. May. *l.* narrow-linear, rigid, channelled above or semi-terete, rarely rather broader and concave, obtuse or acute. *h.* 1ft. to 3ft. 1843. SYN. *H. suave* (under which name it is figured in B. R. 1844, 28).

H. robustum (robust). *fl.* pink, axillary, on short pedicels; heads many-flowered. May. *l.* linear-lanceolate, mucronate. *h.* 2ft. 1842. (B. R. 1842, 8.)

H. suave (sweet). A synonym of *H. angustifolium*.

HYPOCALYPTUS (from *hypo*, under, and *kalypto*, to hide; named from a covering to the unopened flower, observable in most of the species so-called by Thunberg, but which are now referred to *Podalyria*; the character does not seem applicable to the only species that remains in the genus). ORD. *Leguminosæ*. A monotypic genus. The species is an ornamental greenhouse evergreen shrub, thriving in a peat and loam compost. Cuttings of the side shoots will root, during April, in sand, under a hand glass.

H. obcordatus (obcordate).* *fl.* purple. June and July. *l.* trifoliolate; leaflets obcordate, mucronate. *h.* 1ft. to 2ft. Cape of Good Hope, 1823. (B. M. 1913; B. R. 128; B. M. 3894, under name of *Crotalaria purpurea*.)

HYPOCRATERIFORM. Salver-shaped; having a long slender tube and a flat limb, as in the Primrose.

HYPOCYRTA (from *hypo*, under, and *kyrtos*, curved, gibbous; the under part of the corolla tube exhibits a conspicuous gibbosity). ORD. *Gesneraceæ*. A genus comprising about ten species of much-branched stove shrubs, natives, for the most part, of Brazil. Flowers axillary and solitary, or several together; calyx deeply five-parted. Leaves opposite, entire, or sub-dentate. For culture, *see* **Gesnera.**

H. glabra (smooth). *fl.*, corolla rich scarlet, with a short constriction at the base of the tube; limb orange-yellow; calyx segments serrated; peduncles one to three, in the axils of the leaves, longer than the petioles, with a pair of linear bracts at the base. June and July. *l.* opposite, elliptical, obtuse, glossy, very minutely hairy, on short petioles. Stem dark purple, erect, unbranched, succulent. *h.* 8in. to 10in. South America, 1846. (B. M. 4346.)

H. strigillosa (strigillose). *fl.* scarlet, yellow, axillary, solitary; corolla much swollen in front; limb contracted, five-toothed. May. *l.* oblong, acuminate, mucronate, strigillose. Stem erect, villous above. *h.* 2ft. Brazil. (B. M. 4047.)

HYPODEMATIUM. A synonym of **Lissochilus** (which *see*).

HYPODERRIS (from *hypo*, under, and *derris*, a skin; in reference to the cover of the circular sporange). ORD. *Filices*. A genus of two species of stove ferns, closely allied to *Woodsia*. Sori sub-globose, in lines or series parallel with the secondary veins; involucre calyciform, fimbriated at the margin. Probably the second species,

Hypoderris—*continued.*

H. Seemannii, a native of Nicaragua, has not yet been introduced. For general culture, *see* **Ferns.**

H. Brownii (Brown's). *fronds* simple, sub-cordate, hastate, costate, pinnately veined, 10in. to 12in. long. Trinidad.

HYPOESTES (from *hypo*, under, and *estia*, house; referring to the bracts covering the calyx). ORD. *Acanthaceæ*. This genus comprises about forty species of ornamental stove evergreen shrubs or herbaceous perennials, natives of Southern and tropical Africa, Madagascar, West Indies, China, the Malayan Archipelago, and Australia. Flower-heads often sessile, or shortly pedicellate. Leaves entire or dentate. The species require similar treatment to **Justicia** (which *see*).

H. aristata (awned). *fl.* in axillary clusters, which, being more crowded upwards, are there disposed in stout terminal spikes, inclosed singly, or in pairs or threes, in an involucre of two lanceolate, concave bracts, which terminate in long awns; corolla rose-purple; tube pubescent, expanding into a narrowly campanulate throat; lips shorter than the tube; lateral lobes striped, and the middle one spotted with purple. February. *l.* petioled, ovate, acute, membranous, dark green, faintly pubescent above, and still more so beneath. *h.* 2ft. to 3ft. South Africa, 1874. An erect branched herb. (B. M. 6224.)

H. involucrata (involucrate). *fl.* white; racemes axillary, erect, shorter than the leaves. July and August. *l.* lanceolate, toothed. Stem hairy. *h.* 1½ft. India, 1811. Herb.

H. purpurea (purple). *fl.* purple; spikes axillary and terminal. May and June. Branches pubescent. *h.* 2ft. China, 1822. Herb.

H. sanguinolenta (blood-veined).* *fl.* pale purple, with a white throat, and darker markings of purple on the white; sepals narrow, ciliate, shorter than the corolla tube; corolla resupinate; tube slender, curved. *l.* oblong or obovate-oblong, obtuse, narrowed into a rather broad petiole, entire, the margin waved a little, pubescent on both surfaces; veins conspicuously marked with pale purple bands. Stems pubescent. *h.* 6in. to 12in. Madagascar. Herb. (B. M. 5511.)

HYPOGÆOUS. Growing under the earth.

HYPOGYNOUS. Growing from below the base of the ovary.

HYPOLEPIS (from *hypo*, under, and *lepis*, a scale; so called from the marginal covering of the inferior sporange). ORD. *Filices*. A genus of about a dozen species of stove or temperate ferns. Sori marginal, small, sub-globose, uniform, distinct; involucre same shape as sorus, and covering it, formed out of the reflexed margin. For general culture, *see* **Ferns.**

H. Bergiana (Berg's).* *sti.* tufted, 2ft. long, erect, tomentose. *fronds* 1ft. to 1½ft. long, 6in. to 9in. broad, deltoid, quadripinnatifid; pinnæ deltoid; pinnules ovate-deltoid; segments cut down to the rachis. *sori* very small. South Africa, &c., 1874. Greenhouse.

H. californica (Californian). *sti.* densely tufted, about 6in. long, erect. *fronds* small, densely tufted, about 3in. each way, deltoid, quadripinnatifid; lower pinnæ deltoid; pinnules of the lower side much larger than the others. *sori* roundish, two to six to a segment. California. Greenhouse. (H. S. F. ii. 88A.)

H. distans (distant).* *sti.* 6in. high, slender, flexuose. *fronds* about 1ft. long, 4in. to 5in. broad, ovate-lanceolate, bipinnate; pinnæ spreading, at right angles with the rachis; pinnules oblong, cut half-way down. *sori* small, two to four to a pinnule. New Zealand, 1861. Greenhouse.

H. repens (creeping). *sti.* 1ft. to 2ft. long, strong, erect, more or less prickly. *fronds* 3ft. to 4ft. long, quadripinnatifid; lower pinnæ 1ft. to 2ft. long, 6in. to 12in. broad, ovate-acuminate; pinnules lanceolate; segments cut nearly to the rachis. *sori* two to six to a segment. Tropical America, 1824. Stove. (H. S. F. ii. 90C.)

H. tenuifolia (slender-fronded). *sti.* 1ft. long, erect. *fronds* 4ft. to 5ft. long, quadripinnatifid; lower pinnæ ovate-acuminate, 1ft. to 1½ft. long, 6in. to 9in. broad; pinnules lanceolate. *sori* two to six to an ultimate division. Java to Australia, 1824. Stove. (H. S. F. ii. 89C, 90A.)

HYPOLYTRUM (from *hypo*, beneath, and *elytron*, a sheath; in reference to the two or three small scales included within the larger one). ORD. *Cyperaceæ*. A genus containing about twenty-five species, widely distributed over all tropical and sub-tropical regions. Few of the species are, or ever have been, in cultivation in this country; the only one worthy of mention in this work being *H. latifolium*, a handsome, sedge-like, herbaceous

Hypolytrum—*continued.*

stove plant, suitable for table decoration, &c. It prefers a sandy loam and peat compost. Shade and moisture are essential elements in its culture. Propagated by seeds, or by cuttings.

H. latifolium (broad-leaved).* *fl.* of a rich brown colour, disposed in rather dense terminal clusters. *l.* broad-lanceolate. *h.* 2ft. to 4ft. Ceylon, 1877. (B. M. 6282.)

HYPOMENOUS. Free; not adherent.

HYPOPHYLLOUS. Growing on the under side of a leaf.

HYPOXIDEÆ. Now regarded, by Bentham and Hooker, as a tribe of *Amaryllideæ*.

HYPOXIS (from *hypo*, beneath somewhat, and *oxys*, sharp; referring to the base of the capsule). ORD. *Amaryllideæ*. A genus of greenhouse or nearly hardy dwarf-growing herbaceous perennial plants, not bulbous. Flowers yellow, star-shaped. Leaves grass-like. Hypoxis thrive in sandy loam and peat or leaf mould; and may be increased by offsets. Very few are worth growing, except for botanical collections.

FIG. 262. SCAPE AND LEAF OF HYPOXIS ERECTA.

Hypoxis—*continued.*

H. elata (tall). *fl.* golden-yellow, 2in. in diameter; peduncles 1½in. long, slender; scapes numerous, shorter than the leaves, bearing many-flowered racemes. June. *l.* very numerous, 1ft. to 1½ft. long, spreading and revolute, thinly villous above, thickly hairy below. Natal, 1862. (B. M. 5690.)

H. erecta (erect). *fl.* yellow; scape four-flowered; peduncles twice as short as leaves. June and July. *l.* linear-lanceolate. *h.* 6in. North America, 1752. Plant hairy. See Fig. 262. (B. M. 710.)

H. latifolia (broad-leaved). *fl.* bright yellow, large, green externally; peduncles axillary; racemes spicate, many-flowered. *l.*, lower ones squamiform upwards, about 6in. long, broad-lanceolate, acuminated; upper ones narrowest, becoming gradually elongated, 2ft. long. Natal, 1854. (B. M. 4817.)

H. longifolia (long-leaved). *fl.*, perianth golden-yellow within; outer segments lanceolate, sub-acute, green and villous on the back; inner rather broader, with a dorsal green villous midrib; umbel four or five-flowered; scapes several, much shorter than the leaves. August. *l.* numerous, the outer 2ft. long, spreading on the ground; the inner sheath sub-erect; sheath broad, membranous, 2in. to 4in. long; blade grass-like, very slender, flaccid, bright green, with a few scattered hairs on the margin and keel. Stems tufted. *h.* 1½ft. Algoa Bay, 1871. (B. M. 6035.)

H. stellata (star-like).* *fl.* white, blue; scape one-flowered, shorter than the leaves. April to June. *l.* linear-lanceolate, loose-keeled. *h.* 9in. Cape of Good Hope, 1752. (B. M. 662.) The variety figured in B. M. 1223 is *elegans*.

HYSSOP (*Hyssopus officinalis*). An aromatic evergreen bushy herb, native of Southern Europe. It is cultivated for the use of its flowers and tops, which are steeped in water to make an infusion sometimes employed as an expectorant. There are three varieties, known respectively by their blue, red, and white flowers. They may be propagated by seeds, sown in April; by dividing the plants, in spring or autumn; or by cuttings, made in spring, and inserted in a shady situation. Plants raised from seeds or cuttings should, when large enough, be planted out, about 1ft. apart each way, and kept watered until established. They succeed best in a warm aspect, and in a light, rather dry soil. The plants require cutting-in occasionally, but do not need much further attention. Varieties of Hyssop are sometimes employed as edging plants.

HYSSOPUS (from *Hyssopos*, the old Greek name, used by Hippocrates). Hyssop. ORD. *Labiatæ*. A monotypic genus, the species being a hardy shrubby plant. For culture, &c., *see* **Hyssop.**

H. officinalis (officinal). *fl.* bluish-purple, rarely white; whorls six to fifteen-flowered. June to September. *l.* elliptic or linear. *h.* 1ft. to 2ft. Mediterranean region and Central Asia, 1548.

IANTHA. *See* **Ionopsis.**

IANTHE BUGULIFOLIA. *See* **Celsia bugulifolia.**

IANTHINE. Pure blue stained with red, so as to be intermediate between the two colours.

IBATIA. A synonym of **Lachnostoma** (which *see*).

IBBETSONIA (named in honour of Mrs. Agnes Ibbetson, the author of several papers on Vegetable Physiology, published in "Nicholson's Philosophical Journal"). A small genus of shrubby greenhouse Cape plants, now referred to *Cyclopia*. For cultivation, *see* **Podalyria.**

I. genistoides (Genista-like). *fl.* yellow, pea-shaped, with an irregular purplish-brown spot at the base. Summer. *l.* sessile, ternate; leaflets narrow-linear with strongly revolute margins. *h.* 3ft. to 5ft. A much-branched glabrous shrub. (B. M. 1259).

IBERIDELLA (a diminutive of *Iberis*). ORD. *Cruciferæ*. A genus comprising six species of herbs or sub-shrubs, natives of the mountains of Syria, Persia, and Asia Minor; one being from the Himalayas. *I. rotundifolia*, the species usually seen under cultivation, is a very pretty, densely-tufted, spreading, alpine, herbaceous, tap-rooted plant, requiring a rather light soil. It may be freely increased by seeds, or by divisions.

Iberidella—*continued.*

I. rotundifolia (round-leaved).* *fl.* rosy-lilac, with a yellow eye, fragrant, about ½in. in diameter, and disposed in erect, cylindrical, crowded racemes. April. *l.* opposite, fleshy, broadly-ovate. *h.* 3in. to 6in. European Alps, 1868. (B. M. 5749.)

IBERIS (from *Iberia*, the former name of Spain). Candytuft. ORD. *Cruciferæ*. A genus comprising twenty species of annual or biennial herbs or sub-shrubs, from South Europe and Western Asia. Flowers white or purple, racemose or corymbose; petals four, two outer ones largest. Leaves alternate, linear or obovate, entire or pinnatifid. Stems round, usually smooth. All the species are of easy culture in ordinary garden soil, if the position is well exposed to sun and air. The annuals and biennials are increased by seeds. For summer flowering, sow in March or April, and in August or September for a spring display. A light sandy soil is most suitable for sowing the seeds in. The sub-shrubby sorts are handsome, compact-growing plants, admirably adapted for the fronts of shrubberies and herbaceous borders. These species may be increased by seeds, sown in spring; but the most usual method is by cuttings, or by divisions, the latter of which are easily effected.

I. amara (bitter). Common Candytuft. *fl.* white, corymbose, finally racemose. June. *l.* lanceolate, acute, somewhat toothed. *h.* 6in. to 12in. Western Europe (Britain). Annual.

I. a. hesperidifolia (Hesperis-leaved). An improved form of the type; larger, and very pretty. *h.* 1ft.

I. Bernardiana (Bernard's). *fl.* pink, corymbose. Summer. *l.* spathulate, lobed, deep glossy green, forming dense compact rosettes. *h.* 6in. Pyrenees. Annual. SYN. *I. Bubanii*.

I. Bubanii (Buban's). A synonym of *I. Bernardiana*.

I. ciliata (ciliate). *fl.* white. June and July. *l.* linear, entire, ciliated at the base. *h.* 9in. South-western Europe, 1802. Plant herbaceous, rather smooth. Biennial. (B. M. 1030.)

I. c. taurica (Taurian). *fl.* white, corymbose. May to July. *l.* ciliated, somewhat fleshy; lower ones spathulate, somewhat bidentate at the apex; upper ones linear. *h.* 6in. to 9in. Tauria, 1802. Annual or biennial.

FIG. 263. FLOWERING BRANCH AND DETACHED FLOWER OF IBERIS CORONARIA.

I. coronaria (crown-flowering).* Rocket Candytuft. *fl.* pure white, in numerous long, dense heads or spikes at the tops of the stems. July. *l.* lanceolate, coriaceous, entire. *h.* 1ft. 1836. Native country uncertain. Annual. See Fig. 263. (S. B. F. G. ser. ii. 359.) The variety known as the "Giant Snowflake" is a very fine form.

I. correæfolia (Correa-leaved).* *fl.* white, large, disposed in compact flat heads; but, as the stems become elongated, and the succession of buds open, a long round cluster is formed by the old flowers remaining, such heads or spikes being 3in. long. May and June. *l.* spathulate, obtuse, entire, smooth, about 1½in. long.

Iberis—*continued.*

Branches woody, slender, numerous, procumbent. *h.* 1ft. This garden hybrid is a valuable hardy evergreen shrub, thriving in almost any soil or situation; it has a neat and effective appearance at the angles of walks, or used as an edging. The plant may be easily increased, either by layers or by cuttings.

I. gibraltarica (Gibraltar).* *fl.* white, usually suffused with pink or red, large, in corymbose heads. Early spring. *l.* wedge-shaped, blunt, somewhat toothed at the top, rather ciliated. *h.* 1ft. to 2ft. Gibraltar, 1732. A very showy, handsome, but somewhat straggling, half-hardy evergreen species, requiring a well-drained light soil. (B. M. 124.)

I. g. hybrida (hybrid). *fl.* creamy-white, gradually deepening to a pleasing rosy-purple colour. A very desirable variety, being much more compact in habit than the type, and equally as floriferous.

I. jucunda (pleasant). A synonym of *Æthionema coridifolium.*

I. nana (dwarf). *fl.* purple. June and July. *l.* round-spathulate, entire, rather fleshy. *h.* 3in. South France and Italy, 1822. Plant herbaceous, smooth. Annual or biennial. (B. M. 2788.)

I. odorata (sweet-scented). *fl.* white, sweet-scented, racemose. Summer. *l.* linear, toothed, ciliated at the base, dilated at the top. *h.* 6in. to 12in. Greece, 1805. Annual. (S. B. F. G. 50.)

I. Pruiti (Pruit's). *fl.* pure white, in compact heads or corymbs. May or June. *l.* obovate-spathulate, entire, or somewhat toothed. Stems suffruticose at the base, smooth. *h.* 6in. Sicily. Very like *I. Tenoreana*, but having smooth, not ciliated, leaves, and pure white flowers. Perennial.

I. saxatilis (rock).* *fl.* white, corymbose. Spring and summer. *l.* linear, quite entire, somewhat fleshy, acute, ciliated. Stems ascendent. *h.* 3in. to 6in. South Europe, &c., 1739. A very common and pretty dwarf evergreen shrub.

I. semperflorens (ever-flowering).* *fl.* pure white, large, sweet-scented, corymbose. Autumn to spring. *l.* cuneated or spathulate, rather fleshy, blunt, quite entire, smooth. *h.* 1ft. to 2ft. Italy, &c., 1679. A handsome but somewhat delicate evergreen perennial.

FIG. 264. FLOWERING BRANCH OF IBERIS SEMPERVIRENS.

I. sempervirens (evergreen).* Evergreen Candytuft. *fl.* pure white, in long racemes. Spring and summer. *l.* oblong, blunt, narrowed at the base, smooth. *h.* 9in. to 12in. South Europe, 1731. This is the common branching evergreen shrubby species of Candytuft. It is adapted for nearly every style of gardening, and is one of the best perennials grown. See Fig. 264. There are several varieties, including *I. s. superba*, which has a bushy habit, and produces pure white flowers in dense heads.

I. s. Garrexiana (Garrexian).* *fl.* white, corymbose. May. *l.* oblong, narrowed at the base, blunt, quite entire, smooth. *h.* 6in. to 9in. South Europe, 1820. A variety having smaller flowers, and the racemes very much elongated in the course of flowering. Hardy evergreen. (A. F. P. iii. 40, 54.)

I. Tenoreana (Tenore's).* *fl.* purplish or whitish, umbellate. May. *l.* somewhat fleshy, crenated; lower ones obovate, narrowed at the base, and ciliated; upper ones oblong-linear. Stems ascendent, sub-shrubby at the base. *h.* 6in. South-west Europe, 1822. A very desirable perennial species. (B. M. 2783.)

Iberis—*continued.*

FIG. 265. IBERIS UMBELLATA, showing Habit and detached Inflorescence.

I. umbellata (umbelled).* Common Candytuft. *fl.* usually purple, but very variable, in terminal umbels. Spring and summer. *l.* lanceolate, acuminated; lower ones serrated; upper ones quite entire. *h.* 6in. to 12in. South Europe, 1596. A common and well-known pretty hardy annual. See Fig. 265. (B. M. 106.) The following are the most desirable varieties (the descriptions refer to the flowers): *atropurpurea*, dark crimson; *carnea*, blush or pale flesh-coloured; *nana purpurea*, deep purple, dwarf; *purpurea lilacina*, lilac-purple, dwarf.

I. violacea (violet). *fl.* purple; corymb somewhat umbellate. June and July. *l.* stalked, spathulate, blunt-toothed and entire, ciliate. *h.* 3in. 1782. Annual.

ICACINA (a name given on account of the resemblance of the branches to a tree called the Icaco). ORD. *Olacineæ.* A genus comprising three or four species of shrubs, natives of Western tropical Africa. Flowers villous, in terminal panicles. Leaves simple, alternate, exstipulate, shortly petiolate, ovate, entire, reticulate-nerved. Branches ascending or twining. *I. Mannii*, the only species yet introduced, is a shrubby stove climber, thriving in rich sandy loam and leaf mould. Propagated by cuttings, made of the young shoots, and inserted in sandy loam, in bottom heat, under a hand glass.

I. Mannii (Mann's). *fl.* ½in. long, in short, silky, axillary cymes; calyx five-lobed; petals yellow, linear-oblong; stamens exserted. October. *l.* alternate, 5in. to 7in. long, elliptic, abruptly narrowed into a long point, rounded at base, quite entire, shortly petioled, membranous, glabrous, or with midrib beneath and petiole puberulous; nerves few. Stem slender, climbing. Root a large tuber, 6in. to 12in. in diameter, terete, glabrous. Gulf of Guinea, 1865. (B. M. 6260.)

ICACINEÆ. A tribe of *Olacineæ.*

ICARANDA. A synonym of **Jacaranda** (which *see*).

ICE PLANT. *See* **Mesembryanthemum crystallinum.**

ICHNEUMON FLIES. A section of *Hymenoptera*, characterised by usually slender bodies, veined wings, with the veins inclosing several spaces or cells, and long vibratile antennæ of numerous joints (see Fig. 266). The females have an ovipositor, which, in some, is very long;

FIG. 266. ICHNEUMON FLY.

they lay their eggs in the bodies of other insects, especially in larvæ, and the larvæ of the Ichneumon feed in the body of the insect. Sometimes, only one is present; at other times, a large number feed in the same insect. Few

Ichneumon Flies—*continued.*

insects, if any, are wholly free from the attacks of Ichneumons, which are among the most active and efficient allies of the gardener, because of the number of destructive insects killed by them. Hence, Ichneumon Flies ought to be protected, as far as possible, by every horticulturist alive to his own interests.

ICHNOCARPUS (from *ichnos*, a vestige, and *karpos*, a fruit; in reference to the slender follicles). SYNS. *Aganosma, Springia.* ORD. *Apocynaceæ.* A genus comprising nine species of tall climbing stove shrubs, natives of the East Indies, the Malayan Archipelago, Eastern Asia, and tropical Australia. For culture, *see* **Dipladenia.** According to Bentham and Hooker, the plants described under *Aganosma* should be included here.

I. frutescens (shrubby). *fl.* purple, small; corolla salver-shaped; peduncles axillary, very long, racemose. July and August. *l.* opposite, oblong-lanceolate, glabrous. Tropical Asia and Australia, 1759.

ICICA. This genus is now included, by Bentham and Hooker, under *Bursera.*

ICOS. This, in Greek compounds, signifies twenty.

FIG. 267. BRANCH OF IDESIA POLYCARPA.

FIG. 268. BRANCHLET OF IDESIA POLYCARPA CRISPA.

IDESIA (named after Yobrants Ides, a Dutch traveller in China). ORD. *Bixineæ.* A monotypic genus, the species being a large and ornamental hardy tree. It thrives in light and well-drained sandy soil. Increased in spring or autumn, by half-ripened cuttings, inserted in sandy loam, and placed under a bell glass, in gentle heat; also by seeds, sown in spring, likewise in a gentle heat.

I. polycarpa (many-fruited).* *fl.* dicœcious and apetalous, inconspicuous, in terminal panicles. *fr.* in drooping clusters, orange-coloured, about the size of a pea. *l.* large, alternate, cordate, remotely serrulate, acuminate. Japan. SYNS. *Flacourtia japonica, Polycarpa Maximowiczii.* See Fig. 267. (R. H. 1868, 320.)

I. p. crispa (curled). This is a sport from the type, and is remarkable for its curiously cut and crisped leaves. See Fig. 268.

IDOTHEA. *See* **Drimia.**

IDOTHEARIA. *See* **Drimia.**

IGNATIA. Now included under **Strychnos** (which *see*).

IGNEUS. Fiery-red.

ILEX (from *Ilex*, the Latin name given by Virgil to *Quercus Ilex*). Holly. Including *Prinos.* ORD. *Ilicineæ.* A genus comprising 145 species of mostly hardy shrubs or trees, inhabiting temperate and tropical regions, abundant in South America, rare in Africa and Australia. Flowers white, often sub-dicœcious; peduncles axillary, few-flowered, or often ramose. Drupe globose. Leaves alternate, often shining, entire, dentate or spinose. The common Holly, with its innumerable varieties, is well known and extensively cultivated. It submits to training in almost any shape, and soon recovers if severely pruned to preserve the desired character in this respect. Pruning or cutting should be practised either in September or April, both in the case of trained trees and the clipping of hedges. The Holly may be best transplanted at the beginning of May, or early in autumn, when there is sufficient time for new roots to be formed before winter. It does not transplant well when old, but is a long-lived tree when established in good soil and left undisturbed at the root. One of the handsomest and most endurable hedges which can be grown is made from this plant. It is slow-growing, taking eight or ten years from seed to make a fence 4ft. high; consequently, it is less extensively employed than

Ilex—*continued.*

it would otherwise be. It is not unusual to allow a long stem to run up, and form a tree at intervals along a Holly hedge. The red berries, contrasting with the dark green foliage throughout the winter, have a very pleasing appearance, and the branches are in great request for Christmas decorations. Propagation is usually effected by seeds, which require treatment similar to those of the Hawthorn, being collected when ripe in the autumn, and buried in sand until the following spring or autumn, when they may be sown in drills or beds and covered with 1in. of soil. A few boughs, placed over the beds, will be very serviceable as a protection against frosts or the heat of the sun, which latter is injurious to the young Hollies. The plants may remain in the seed-beds for two years, and can then be transferred into nursery rows 1ft. apart. After being transplanted, they must stand for two years at least, when they will require to be again removed, to give them more space. The plants will then be about 1½ft. or 1½ft. high. The varieties can only be propagated by grafting, during March; and by budding, in May, with a pushing bud, or in August with a dormant one. Stocks for both purposes may be of the common sort, raised from seed. There are a number of varieties of far more horticultural value than the species. The variegated forms are particularly attractive.

FIG. 269. ILEX AQUIFOLIUM.

I. Aquifolium (prickly-leaved).* Common Holly. *fl.* sub-umbellate; peduncles axillary, short, and many-flowered. May and June. Berries red, roundish. *l.* ovate or oblong-acute, shining, waved, spiny-toothed. *h.* 10ft. to 40ft. Europe (Britain) and West Asia. See Fig. 269. From the bark of this, as well as some other species, birdlime is obtained.

I. Cassine (Cassine). *fl.* in clusters, nearly sessile, smooth. May. *l.* alternate, evergreen, lance-ovate or elliptical, crenate. South United States, 1726. Shrub. The leaves are used for tea by the people along the coast, as they formerly were to make the celebrated "Black Drink" of the North Carolina Indians.

I. chinensis (Chinese). *fl.*, corymbs pedunculate, dichotomous. July. *l.* ovate-oblong; edge with little, cartilaginous, scarcely pungent teeth. *h.* 10ft. China, 1814. (B. M. 2043.)

I. cornuta (horned).* Berries large. *l.* hard, dark green, almost always furnished with three strong spines at the end, which, in mature plants, assume the appearance of horns; when young, one or two more spines are added at each side, but these disappear in old plants. North China, 1850. A fine hardy Holly. See Fig. 270. (G. C. 1850, p. 311.)

I. crenata (crenated).* *fl.*, peduncles drooping, scattered on the branches, usually three-flowered. Spring. *l.* ovate, crenate, blunt, with revolute edges. Japan. Of this compact-growing, small-leaved species, there are several forms: *Fortunei* has rounder leaves, and is a stronger grower than the type; *variegata* has leaves blotched with dull yellow. See Fig. 271.

I. Dahoon (Dahoon). *fl.*, peduncles lateral and terminal, in panicled corymbs. May and June. Berries red. *l.* lanceolate-elliptical, coriaceous, almost quite entire, with the edges a little revolute, and with the midrib, petioles, and branchlets villous. *h.* 8ft. North America, 1726. (W. D. B. ii. 114.)

Ilex—*continued.*

FIG. 270. ILEX CORNUTA, showing Habit, detached Flowering Branch, and Flower.

I. D. myrtifolia (Myrtle-leaved). *fl.*, peduncles slender, three to nine-flowered, or the more fertile shorter and one-flowered, smooth. May. *l.* linear-lanceolate or linear-oblong, sparingly and sharply serrate or entire. *h.* 6ft. South United States, 1806. Shrub.

FIG. 271. BRANCHLET OF ILEX CRENATA VARIEGATA.

I. decidua (deciduous). *fl.*, peduncles of the sterile flowers longer than the petioles, of the fertile ones short; calyx teeth smooth, acute. May. *l.* wedge-oblong or lance-obovate, obtusely serrate, downy on the midrib beneath, shining above. United States. Shrub. (W. D. B. ii. 115.)

FIG. 272. LEAF OF ILEX DIPYRENA.

Ilex—*continued.*

I. dipyrena (two-seeded).* *fl.* small, sessile, disposed in axillary fascicles. April and May. Berries dark brown, two-seeded. *l.* elliptical-oblong, mucronate, on short stalks, even, hardly wavy, remotely spiny-serrated. Branchlets angular. *h.* 12ft. North India, 1840. See Fig. 272. (B. F. F. 15.)

I. glabra (smooth). Inkberry. *fl.*, peduncles of the sterile flowers three to six-flowered, of the fertile ones one-flowered; calyx teeth rather blunt. June. *l.* wedge-lanceolate or oblong, sparingly toothed towards the apex, smooth. *h.* 2ft. to 3ft. North America, 1759. Shrub. SYN. *Prinos glaber.* (L. B. C. 450.)

I. Gongonha (Gongonha). *fl.* pentandrous, with entire stigma. *l.* elliptic, mucronate, spiny-toothed, rounded at base. *h.* 30ft. Brazil. This species is employed as tea in its native country.

I. lævigata (smooth). *fl.* six-cleft. June. *l.* lanceolate or oblong-lanceolate, pointed at both ends, appressed-serrulate, shining above, mostly glabrous beneath. *h.* 4ft. North America Shrub. SYN. *Prinos lævigatus.* (W. D. B. i. 28.)

I. latifolia (broad-leaved).* *fl.*, pedicels aggregate, longer than the petiole, and rising above the axils of the leaves. *l.* ovate, bluntish, serrated, shining above, with revolute edges. *h.* 20ft. Japan, 1840. (B. M. 5597.)

I. mollis (soft). *fl.*, sterile ones very numerous, in umbel-like clusters, the pedicels shorter than the petiole, and (with the calyx) soft-downy; the fertile peduncles very short. *l.* soft, downy beneath, oval, ovate, or oblong, taper-pointed at both ends, especially at the apex, thin-membranaceous, sharply serrulate. North America. Shrub. SYN. *Prinos dubius.*

I. monticola (mountain). *fl.*, fertile ones very short-peduncled; calyx ciliate. May. *l.* ovate or lance-oblong, ample, taper-pointed, thin-membranaceous, smooth, sharply serrate. North America. Shrub.

I. opaca (shady).* American Holly. *fl.* in loose clusters along the base of the young branches and in the axils; calyx teeth acute. May and June. *l.* oval, flat; the wavy margins furnished with scattered spiny teeth. *h.* 20ft. to 40ft. United States, 1744. (W. D. B. i. 3.)

I. paraguariensis (Paraguay). Brazilian Tea; Caa-Cuys; Caa-Mini; Caa-Quazu; Paraguay Tea. *fl.*, peduncles axillary; many-parted. *l.* obovate, oblong, bluntish, remotely serrated. *h.* 15ft. Paraguay, 1823. A greenhouse evergreen tree. The dried leaves of this species furnish the Yerba de Maté, or Paraguay Tea, of which enormous quantities are consumed in South America. (B. M. 3992.)

I. platyphylla (broad-leaved). *fl.*, corolla lobes concave, obovate; stamens shorter than the lobes; pedicels with two small bracts below the middle, thickened upwards; cyme many-flowered, longer than the thickened petioles. May. *l.* extremely variable in size and shape, generally broadly ovate, approaching orbicular, thick, coriaceous, quite entire. *h.* 20ft. Canary Islands, 1844. A hardy evergreen, pyramidal tree. (B. M. 4079.)

I. verticillata (whorled). Black Alder; Winterberry. *fl.* all very shortly peduncled. May and June. *l.* obovate, oval, or wedge-lanceolate, pointed, acute at the base, serrate, downy on the veins beneath. *h.* 6ft. North America, 1736. Shrub. SYN. *Prinos verticillatus.* (W. D. B. i. 30.)

VARIETIES. The varieties of *I. Aquifolium* are extremely varied in character, marking, and form. Those enumerated below are the most serviceable and generally grown. For most of the descriptions, we are indebted to Mr. T. Moore's synopsis, which appeared in the "Gardeners' Chronicle." The list is here divided into two sections.

I. Green-leaved Varieties.

I. A. balearica (Balearic).* *fl.*, umbels axillary, few-flowered, short. May to July. *l.* ovate, acute, shining, flat, entire or spiny-toothed. *h.* 10ft. Minorca, 1815.

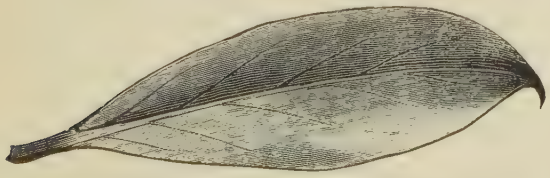


FIG. 273. LEAF OF ILEX AQUIFOLIUM BESSONI.

I. A. Bessoni (Besson's). *l.* obovate-lanceolate, quite spineless, less rigid in texture and lighter green in colour than most other varieties. See Fig. 273.

I. A. costata (ribbed). Grecian Holly. *l.* oblong-acute, 2½in. long, 1½in. broad, furnished with slightly divaricate somewhat distant spines. Distinct and free-growing.

Ilex—*continued.*

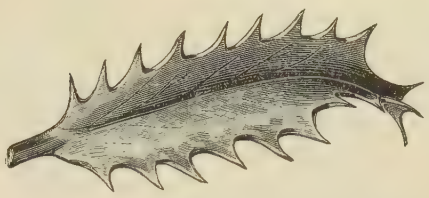


FIG. 274. LEAF OF ILEX AQUIFOLIUM CRASSIFOLIA.

I. A. crassifolia (thick-leaved). *l.* dull green, very thick, with recurved tips and margins, furnished with prominent saw-like teeth. A slow-growing, dwarf, bushy variety, with purple bark. See Fig. 274.

FIG. 275. LEAF OF ILEX AQUIFOLIUM DONINGTONENSIS.

I. A. Doningtonensis (Donington's). *l.* lanceolate, sometimes turned to one side, so as to become sickle-shaped, about 2in. long and ⅔in. broad; margin having a few, or sometimes no spines. A distinct variety, of free pyramidal growth. See Fig. 275. (G. C. n. s., ii. 687.)

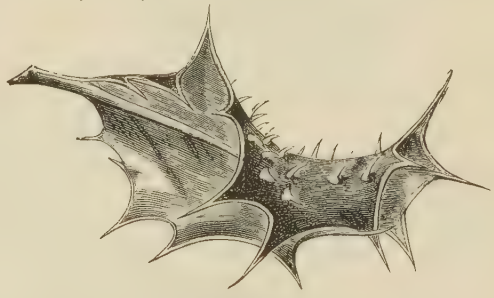


FIG. 276. LEAF OF ILEX AQUIFOLIUM FEROX.

I. A. ferox (fierce). Hedgehog Holly. *l.* ovate-oblong or narrowly-ovate, 2in. or more long, much acuminate, with strongly-developed divaricate marginal spines. The convex spiny surface of the dark green leaves is its chief characteristic. Bark purple. See Fig. 276.

I. A. Foxii (Fox's). *l.* ovate, stoutish, 2in. to 2½in. long, with rather distant, regular, plane, freely-developed spines. A small-growing form. (G. C. n. s., ii. 751.)

FIG. 277. LEAF OF ILEX AQUIFOLIUM HENDERSONI.

I. A. hastata (halbert-shaped).* *l.* from ⅔in. to 1¼in. long, about ½in. broad; spines large, very prominent, consisting usually of one or two pairs on each side at the base, but occasionally more, the

Ilex—*continued.*

upper half of the leaf forming a large, entire, oblong, bluntish lobe. A remarkable form, sometimes known as *latispina minor*, *I. nana*, and *I. pygmæa*. (G. C. n. s., ii. 687.)

I. A. Hendersoni (Henderson's). *l.* about 2⅜in. long by 1⅝in. broad, oblong-elliptic, opaque, dark green with sunken veins, margin generally entire. Bark purplish. See Fig. 277.

I. A. heterophylla (variable-leaved). *l.* ovate or elliptic-ovate, about 2½in. long, 1in. to 1½in. wide, twisted near the point, entire or distinctly spinose. A strong-growing form. (G. C. n. s., ii. 519.)

I. A. Hodginsii (Hodgins'). *l.* very broadly ovate, 3in. to 4in. long, 2½in. broad, with distant and rather unequally-disposed but strong spines. A handsome form.

I. A. maderensis (Madeira). *l.* ovate or ovate-oblong, with a short acuminate point, 3in. long, about 1⅜in. wide; margin with tolerably regular spines lying in the plane of the leaf. Less hardy than many others.

I. A. monstrosa (monstrous). *l.* oblong, much acuminated, with numerous strongly-developed marginal spines, which are mostly directed upwards. (G. C. n. s., ii. 751.)

I. A. myrtifolia (Myrtle-leaved).* *l.* ovate-lanceolate, 1in. to 1½in. long, ½in. to ⅝in. broad, usually moderately spiny at the margin, but sometimes quite entire. Known also as *angustifolia*. (G. C. n. s., ii. 687.)

I. A. nobilis (noble). *l.* roundish-ovate, 2⅜in. to 3⅜in. long, with somewhat distant, bold, marginal spines. A vigorous-growing form. (G. C. n. s., ii. 432.)

FIG. 278. LEAF OF ILEX AQUIFOLIUM OVATA.

I. A. ovata (ovate-leaved). *l.* ovate, 2½in. long, with regular angular, scarcely spiny teeth. A slow-growing but distinct form. See Fig. 278. (G. C. n. s., ii. 751.)

I. A. platyphylla (broad-leaved).* *l.* broadly-ovate, 3½in. long, 2½in. broad; spines variable in disposition, sometimes evenly disposed around the edge.

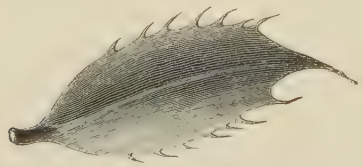


FIG. 279. LEAF OF ILEX AQUIFOLIUM PYRAMIDALIS.

I. A. pyramidalis (pyramidal). *l.* ovate, acuminate, dark green, with six or eight spines on the same plane as the leaf. A distinct variety, of more erect, pyramidal habit than most others. See Fig. 279.

I. A. recurva (recurved). *l.* ovate-acuminate, about 1½in. long, ½in. broad; margin spiny throughout, usually terminating in an elongated spine. A dwarfish form, sometimes known as *tortuosa*. (G. C. n. s., ii. 687.)

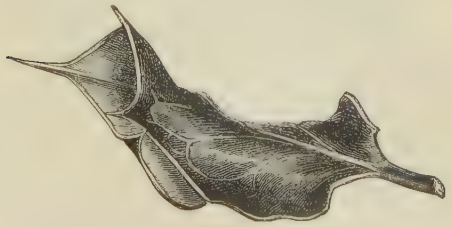


FIG. 280. LEAF OF ILEX AQUIFOLIUM TORTUOSA.

Ilex—*continued.*

I. A. serratifolia (saw-edge-leaved). *l.* lanceolate, about 1½in. long and ¼in. broad, stiff; midrib convexly curved; spines numerous, regular, stoutish. Resembling *myrtifolia*. (G. C. n. s., ii. 687.)

I. A. tortuosa (twisted). *l.* nearly 2in. long, about 1in. broad, the blade being once spirally twisted, the edge being, in addition, more or less revolute or marginate, rarely spiny. A vigorous grower, of dense habit. Commonly known as the Screw Holly. See Fig. 280.

I. A. Whittingtonensis (Whittington's).* *l.* lanceolate, or elliptic-ovate, about 2½in. long, ⅝in. wide, sometimes slightly recurved; spines numerous, stiff. An elegant and distinct form. (G. C. n. s., ii. 687.)

II. Silver and Gold-leaved Varieties.

I. A. albo-picta (white-blotched). A synonym of *I. A. argentea medio-picta*.

I. A. argentea elegantissima (very elegant silver-striped). *l.* elliptic or elliptic-ovate, about 2½in. long, with unequal spines, which are generally few and distant; central part dark green, with grey blotches; margin creamy-white. Known also as *elegantissima*.

I. A. argentea marginata (silver-margined).* *l.* broadly-ovate, 2in. to 2½in. long, usually spiny, dark green, with the disk slightly mottled, and with an irregular narrowish silvery margin. There are several garden names for this old variety, including *albo marginata*, *argentea lato marginata*, and *variegata argentea*.

FIG. 281. LEAF OF ILEX AQUIFOLIUM ARGENTEA MEDIO-PICTA.

I. A. argentea medio-picta (white blotched). *l.* ovate or cuneately-ovate, 1½in. to 2in. long, about 1in. broad, with strong and much divaricated spines. Colour dark green at edge, with large central blotch of creamy-white. Bark green. SYNS. *I. A. albo-picta*, I. Silver Milkmaid. See Fig. 281.

I. A. argentea stricta (upright silvery). *l.* oblong-elliptic, 2in. to 2½in. long, 1½in. broad; spines somewhat wavy; disk conspicuously mottled with flakes of green and greyish-green; edge broadly and unequally margined with creamy-white.

I. A. aurea angustifolia (narrow-leaved golden).* *l.* elliptic-oblong, acuminate, 1½in. to 2½in. long, nearly 1in. broad, with a spiny and rather wavy edge; centre pale green; margin deep golden. (G. C. n. s., v. 44.)

I. A. aurea latifolia (broad-leaved golden).* *l.* ovate, 2in. to 2½in. long, strongly divaricate, and with well-developed spines; disk splashed with pale green, and there is a narrow but irregular deep golden edge.

I. A. aurea maculata (gold-spotted). *l.* oblong-ovate, about 2½in. long, with distant triangular spines; disk with a large blotch of creamy-yellow, surrounded by a green border. A distinct variety, sometimes known as *maculata aurea*.

I. A. aurea marginata bromeliæfolia (gold-margined Bromelia-leaved). *l.* ovate, with flattish distant marginal spines, and a flat acutely-lengthened point; disk mottled with pale green on a dark green ground; margin with an unequal but well-defined band of yellow. Known also as *bromeliæfolia aureo-marginata*.

I. A. aurea marginata fructu-luteo (gold-margined, yellow-berried). Berries yellow. *l.* ovate, 2½in. long, coarsely and rather distantly spined; disk green, blotched with grey; edge greenish-yellow.

I. A. aurea picta latifolia (gold-painted, broad-leaved).* Golden Milkmaid. *l.* ovate or broadly-ovate, 2in. or more in length, and sometimes 1½in. broad; spines variable in number and position; disk irregularly marked by a large branching deep yellow blotch, with an irregular, often narrow, deep glossy green margin. A very handsome and distinct form. (G. C. n. s., v. 365.)

I. A. aurea regina.* Golden Queen. *l.* broadly-ovate, 2½in. to 3in. long, 1½in. to 2in. broad, with very strong spreading and variously-directed spines; disk usually much mottled with grey

Ilex—*continued.*

and green, with a broad, well-defined, continuous margin of deep golden-yellow. A very handsome form, and said to be the finest of the gold-edged series. It is also known as *aurea marginata*, *latifolia marginata*, and *reginæ*. (G. C. n. s., v. 44.)

I. A. Cookii (Cook's). *l.* ovate, flat, with rather weak spines; very dark green, with a narrow edge of greenish-yellow, and some central blotches. (G. C. n. s., v. 437.)

I. A. ferox argentea (fierce, silvery).* Silver-striped Hedgehog. *l.* ovate, more or less convex, deep green, bristling with stiff echinate spines towards the front and edges; margin and surface spines creamy-white. Known also as *ferox argentea variegata*. (G. C. n. s., v. 44.)

I. A. Handsworthensis (Handsworth).* *l.* elliptic-oblong, 2½in. to 3in. long, margined with very strong prominent white spines; disk mottled with green and greyish-green, and with a distinct and tolerably even margin of creamy-white. A handsome, free-growing form.

I. A. heterophylla aureo-picta (various-leaved, gold-painted). *l.* ovate, flat, toothless, 2½in. long; edge dark green; middle conspicuously marked with a broad, unequally-developed, feathery blotch of bright yellow. (G. C. n. s., vi. 389.)

I. A. Hodginsii aurea (Hodgins' golden).* *l.* broadly oblong-ovate; disk conspicuously mottled with dark and grey-green; margin broad, golden.

I. A. Lawsoniana (Lawson's).* *l.* ovate or bluntly elliptical, 2½in. to 3½in. long, opaque green; central or discal portions marked with broad bands or blotches of yellow; spines distant. Very handsome. The same as *Lawsoniana variegata*. (G. C. n. s., v. 624.)

I. A. Madame Briot. *l.* large, 2½in. to 3in. long, 1½in. to 1½in. broad, oblong-ovate, furnished at the edge with strongly-developed wavy or divaricate spines; surface considerably mottled with yellow and green on the disk, and having a narrow golden edge. Of Continental origin.

I. A. maderensis variegata (variegated Madeiran). *l.* ovate or obovate, 2in. to 2½in. long, distantly plane-spined, or occasionally somewhat wavy; dark green at the margin, with a feathered golden blotch, mixed with pale green in the centre.

I. A. scotica aurea (Scotch golden). *l.* obovate, marginate, about 1½in. long, nearly entire, but loosely wavy, narrowing to wedge-shaped at the base; disk dark mottled green, with a broad golden edge.

I. A. Wateriana (Waterer's).* *l.* oblong, ovate, or obovate, often oblique, 1¾in. to 2½in. long, with or without spines; disk dark green, mottled, often in sectional streaks, with yellowish-green and greyish-green, and with a broad but irregular marginal band of deep golden-yellow, which is not continuous, sometimes wholly golden, at others half golden. A beautiful dense dwarf shrub. It is known also as *compacta aurea* and *nana aurea*. (G. C. n. s., vi. 233.)

ILICINEÆ. A small natural order of trees or shrubs, of which the common Holly, *Ilex Aquifolium*, is the type. Flowers white, often small; inflorescence axillary and terminal, cymose. Leaves alternate; stipules minute or absent, petiolate, simple, generally coriaceous, often entire. The species inhabit temperate and tropical regions, but are absent from North-west America. They contain a bitter principle, the Ilicine of chemists, combined in various proportions with an aromatic resin and a glutinous matter, to which some species of Holly owe medicinal properties. There are about 150 species, and the following genera: *Byronia*, *Ilex*, and *Nemopanthes*. The order is sometimes known as *Aquifoliaceæ*.

ILLAIREA. This genus is now included under **Loasa** (which *see*).

ILLECEBRACEÆ. An order of sub-erect, diffuse, or pulvinately-tufted, annual or perennial herbs (rarely shrubs or sub-shrubs). The species are widely distributed, principally throughout warm and dry regions, many being found in South Europe and North Africa. Flowers green or white, regular, generally hermaphrodite, inconspicuous, herbaceous, often scariously bracted, generally disposed in trichotomous cymes; petals small or absent. Fruit small, indehiscent, or three-valved. Leaves generally opposite, small, entire; base often connate; stipules scariose, simple, bifid or connate, rarely none. The order comprises seventeen genera and about ninety species. Illustrative genera are: *Illecebrum*, *Paronychia*, and *Scleranthus*.

ILLECEBRUM (from *illecebra*, an old Latin word, meaning enticement or attraction, applied by Pliny to the

Illecebrum—*continued.*

Stonecrop). ORD. *Illecebraceæ*. A genus now reduced to a single species, but which formerly included several South European ones now forming the genus *Paronychia*. *I. verticillatum* is a small, hardy, glabrous, much-branched annual, thriving best in a moist peat soil. Propagated by seeds.

FIG. 232. FLOWERING SHOOT OF ILLECEBRUM VERTICILLATUM.

I. verticillatum (whorled). *fl.* shining-white, in whorls, in the axils of the leaves. Summer. *l.* opposite, obovate, green. *h.* 1in. to 3in. North Africa and West Europe (Britain, only in Devon and Cornwall). See Fig. 282.

ILLICIUM (from *illicio*, to entice or allure; on account of the agreeable aromatic smell of the species). Aniseed-tree. ORD. *Magnoliaceæ*. A genus comprising five species of half-hardy evergreen shrubs. Flowers very beautiful and fragrant, singly or in threes from the sides of the branches; petals nine to thirty, disposed in several series. Carpels stellately-disposed, capsular, opening on the upper side. Leaves oblong, stalked, coriaceous, exhaling a strong odour of Aniseed. The species thrive in a compost of sandy loam and peat, and need greenhouse protection during winter, except in the southern counties. Propagated, during summer, by cuttings of young ripened shoots, inserted in sandy soil, under a hand glass.

I. anisatum (Anise-scented).* *fl.* yellowish-white, small, disposed in terminal clusters. Summer. *l.* entire, smooth. *h.* 4ft. China and Japan. This tree is held sacred by the Japanese, who form wreaths of it with which to decorate the tombs of their deceased friends; they also burn the bark as incense before their deities. The leaves are reported to possess poisonous properties. SYN. *I. religiosum*. (B. M. 3965.)

I. floridanum (Floridan).* *fl.* of a fine deep red, having the appearance of being double; petals twenty to thirty; peduncles hanging down, but becoming erect as the petals drop. April to July. *l.* oblong-lanceolate, acuminate. *h.* 8ft. Florida, 1771. (B. M. 439.)

I. parviflorum (small-flowered). *fl.* scentless; petals yellowish, six to twelve, ovate-roundish; sepals three, ovate, somewhat ciliated. May and June. *l.* lanceolate, acute, scented. *h.* 3ft. Southern United States, 1790.

I. religiosum (holy). Synonymous with *I. anisatum*.

IMANTOPHYLLUM (from *imas*, *imantos*, a leather thong, and *phyllon*, a leaf; alluding to the shape and substance of the foliage). ORD. *Amaryllideæ*. This genus is now included under *Clivia*; but, as the plants

Imantophyllum—*continued.*

described below are so well known in gardens under the name here given, the genus *Imantophyllum* is retained. The species are exceedingly ornamental plants for greenhouse decoration in spring and summer. They may be propagated from seed; but, as the production of seed has such a weakening effect on the plants ripening it, this method is not generally practised. The usual mode is to propagate by divisions or offsets, secured when repotting the old plants. Unless very small, they should be inserted at first in 5in. pots, so that they can remain for a year without further disturbance. The roots are large and fleshy, and become so thickly matted together in established plants that it is difficult to separate them. Imantophyllums succeed best in soil composed chiefly of fibry loam, with some leaf mould and charcoal added. A little crushed bone or bone dust is sometimes intermixed, with good results, as the plants seldom need repotting when once established. They may be grown to flower in pots ranging from 5in. to 10in. in diameter, according to the strength of the different plants. Syringing and any amount of water may be applied in summer, when new growth is being made; and a temperature of 50deg. to 60deg., with air in spring and summer, will be sufficient. In winter, less water should be given, and a season of rest allowed, by keeping the plants quite cool. Good drainage must be insured when potting; and an annual top-dressing of rich soil, applied to old plants, in spring, will be preferable to disturbing their roots. Imantophyllums keep in flower a long time in a cool greenhouse.

I. Aitoni (Aiton's). A synonym of *Clivia nobilis*.

I. cyrtanthiflorum (Cyrtanthus-flowered). *fl.* clear rich salmon or light flame-coloured, large, with a light centre; perianth cup-shaped, pendulous; corymbs broad. Winter and spring. *l.* dark green. A supposed hybrid between *A. miniatum* and *Clivia nobilis*. See Fig. 283. (F. d. S. 1877.)

Imantophyllum—*continued.*

I. Gardeni (Garden's).* *fl.* reddish-orange or yellow; perianth 2in. to 3in. long, curved downwards; scape as long as the leaves, with an umbel of ten to fourteen flowers. Winter. *l.* narrow, 1ft. to 2ft. long, distichous, arching, deep green. Natal and Transvaal, 1862. (B. M. 4895, under name of *Clivia Gardenii*.)

I. miniatum (brick-coloured).* *fl.* fine deep orange, lower part deep buff, anthers and style bright yellow; perianth about 2in. long, somewhat vase-shaped; umbel large, ten to twenty-flowered. Spring and summer. *l.* ligulate, acute, distichous, 1ft. to 2ft. long, broadly sheathed at the base, deep green. *h.* 1ft. to 2ft. Natal, 1854. See Fig. 284. (B. M. 4783.) *I. m. splendens* is a fine form, with much brighter and deeper coloured flowers than the type. There are several hybrids, which are very attractive.

IMBERBIS. Without hairs.

IMBRICATE. Overlapping each other.

IMHOFIA. Included under **Hessea** (which *see*).

IMMARGINATE. Having no rim or edge.

FIG. 283. IMANTOPHYLLUM CYRTANTHIFLORUM, showing Habit and detached Flower.

IMMORTAL FLOWER, or **IMMORTELLE.** A name applied to various species of *Antennaria, Gnaphalium, Helichrysum, Xeranthemum,* &c.

FIG. 285. IMPARI-PINNATE LEAF.

IMPARI-PINNATE. A term applied to a pinnate leaf having a terminal or odd leaflet. An Impari-pinnate leaf is shown at Fig. 285.

IMPATIENS (from *impatiens*, impatient; referring to the elasticity of the valves of the seed-pod, which

Impatiens—*continued.*

discharge the seeds when ripe). Balsam. SYN. *Balsamina.* ORD. *Geraniaceæ.* A genus comprising about 135 species of greenhouse or hardy, annual or biennial herbs, sometimes suffrutescent, natives, for the most part, of the mountains of tropical Asia and Africa, rare in Europe, North America, North Asia, and South Africa. Flowers purple, yellow, pink, or white, often showy; peduncles axillary; petals four, cruciate; two outer ones alternating with the sepals, upper one arched and emarginate, lower one drawn out into a spur at the base; branches many-flowered. Leaves alternate, very rarely opposite. Comparatively few of the species are now in cultivation. The hardy annual kinds may be readily raised from seed, in spring, and they succeed in any ordinary light soil. The stove and greenhouse species may be propagated from cuttings; or from seeds, when these are to be obtained. Cuttings generally root freely in a close frame. *I. Sultani* is one of the most beautiful and easily grown plants in cultivation. It succeeds well in a greenhouse throughout the summer, but requires an intermediate or warm structure in winter. If cuttings are taken from strong, healthy shoots, they root quickly in a propagating frame, at almost any season. They are best inserted singly in small pots, and afterwards kept somewhat restricted at the root, by only allowing very moderate shifts. Useful decorative plants may be grown in 5in. or 6in. pots, and they usually succeed better in these than in larger sizes. A rich, open soil should be used. This species is comparatively new, and has been recommended for summer bedding outside; but it has hitherto been tried without much success. *I. flaccida alba* is very useful; it succeeds under the same treatment as *I. Sultani*. *I. Jerdoniæ* is a dwarf species, and requires special treatment. It should be placed in a basket, about April, in a compost of peat and loam, and be suspended in a moist stove until beginning to flower, when a cooler and drier position will be more suitable. Towards November, the leaves will drop, and the stems become swollen, thus indicating their ripening off. The plants should then be removed, and suspended near the glass in a house where there is a temperature of about 55deg., and a rather dry atmosphere maintained. Here they should be allowed to remain quite dormant, until starting time in April, the following year.

FIG. 284. IMANTOPHYLLUM MINIATUM.

Impatiens—*continued.*

I. amphorata (pitcher-like).* *fl.* pale purple, suffused and speckled with rose-red, 1½in. long; sepals greenish, broadly orbicular-cordate, acute; standard orbicular, notched at top, spurred behind; lip cylindri-saccate, tip rounded with a short red incurved spur ⅜in. long; lateral lobe rounded, terminal, pendulous, obtuse; racemes 2in. to 5in. long, many-flowered August and September. *l.* bright green, often with pink edges and midrib, 3in. to 6in. long, petioled, elliptic-ovate or lanceolate, acuminate, finely crenate-serrate. Stem succulent, branched upwards. *h.* 3ft. to 6ft. Western Himalayas. A handsome hardy annual. (B. M. 6550.)

I. Balsamina (Balsam).* Common Balsam. *fl.* red; pedicels aggregate. Summer. *l.* lanceolate, serrated; lower ones opposite. *h.* 1ft. to 2ft. Tropical Asia, 1596. A well-known annual. SYN. *Balsamina hortensis.* See Fig. 286. For general cultivation, *see* **Balsam.**

I. B. coccinea (scarlet). *fl.* red; spur incurved, as long as the flower. June to September. *l.* alternate, oblong-oval, serrated; leafstalks with many glands. *h.* 2ft. East Indies, 1808. Stove annual. (B. M. 1256.)

I. bicolor (two-coloured). *fl.*, lateral sepals green, small; vexillum white, green at back, very convex; labellum purple, ample, with a long, curved, obtuse tail; mouth pure white; pedicels slender, glabrous, about 2in. long, generally aggregate. December. *l.* alternate, glabrous, 3in. to 5in. or more long, elliptic-ovate, acuminate, attenuated towards the base, coarsely serrated. Stem purplish-green, woody at base, herbaceous above. Fernando Po, 1862. Stove perennial. (B. M. 5366.)

I. candida (white). *fl.* white, slightly speckled with crimson, large, showy. Autumn. *l.* narrow-lanceolate, acuminate, with crimson serration, in whorls of three. *h.* 6ft. Himalayas, 1839. Hardy annual. (B. R. 1841, 20.)

Impatiens—*continued.*

I. chinensis (Chinese). *fl.* red; peduncles axillary, solitary or twin; spur long, filiform. July and August. *l.* opposite, sessile, lanceolate, setaceously serrated. *h.* 2ft. India, 1840. Greenhouse annual. SYN. *I. setacea.* (B. M. 4631, under name of *I. fasciculata.*)

I. cornigera (horn-bearing). A synonym of *I. glandulifera.*

I. flaccida (flaccid).* *fl.* rich purple, flat, about 2in. long. Summer. *l.* dark shining green, about 4in. long. Mountains of Malabar, Ceylon, &c., 1861. *h.* 6in. to 18in. Greenhouse annual. (B. M. 5276.) A pale purple-flowered form of this is figured in B. M. 5625, under name of *I. latifolia.*

I. f. alba (white) differs from the typical species only in having pure white flowers. Greenhouse annual. This form is frequently met with in gardens under the names of *I. Sultani alba* and *I. platypetala alba.*

I. fulva (tawny). *fl.* orange-colour, thickly spotted with reddish-brown, loosely panicled at the ends of the branches, hanging gracefully on their slender nodding stalks, the open mouth of the horn-shaped sepal upward; sac longer than broad, acutely conical, tapering into a strongly-inflexed spur. June to September. *l.* ovate or oval, coarsely toothed, petioled. *h.* 2ft. to 4ft. North America, but naturalised within the last half century in Britain, and spreading rapidly. Hardy annual. (Sy. En. B. 314.)

FIG. 286. FLOWERING SHOOT OF IMPATIENS BALSAMINA FLORE-PLENO.

I. glandulifera (gland-bearing). *fl.* rose, axillary, fascicled and shortly pedicelled; spur short, minute. August. *l.* whorled, lanceolate, glandularly serrate; stipules glandular. Ceylon, 1839. Greenhouse annual. (B. M. 4623, under name of *I. cornigera.*)

I. Hookeriana (Hooker's).* *fl.* white, streaked with crimson, large; petals broad. Winter. *l.* large, pale green. *h.* 2½ft. Ceylon, 1852. Stove perennial. (B. M. 4704.)

I. Jerdoniæ (Mrs. Jerdon's).* *fl.* large, axillary, six to eight in a cluster; sepals green, side ones bright yellow; pouch bright red. Summer. *l.* oval, disposed on the upper part of the gouty stems. *h.* 9in. East Indies, 1852. A rare but distinct and ornamental stove annual. (B. M. 4739.)

I. macrophylla (large-leaved). *fl.* yellow, red; peduncles one-flowered, aggregated; spur short. July and August. *l.* large, alternate, ovate-acuminate, mucronate, serrate. *h.* 3ft. Mountains of Ceylon, 1838. Stove perennial. (B. M. 4662.)

I. noli-me-tangere. Touch-me-not. *fl.* yellow, spotted internally with red, large; peduncles three or four-flowered. July. *l.* ovate, coarsely toothed. *h.* 1ft. to 1½ft. Europe (Britain), Siberia, and West Asia. Hardy annual. (Sy. En. B. 313.)

I. pallida (pale). *fl.* pale yellow, sparingly dotted with brownish-red; sac dilated, and very obtuse, broader than long, tipped with a short incurved spur. July to September. *l.* ovate or oval, coarsely toothed, petioled. North America. Hardy annual.

I. platypetala (broad-petaled). *fl.* rose; petals transversely obcordate; peduncles one-flowered, shorter than the leaves; spur

Impatiens—*continued.*

filiform, falcate. Summer. *l.* whorled, oblong-lanceolate, argutely serrated. *h.* 1½ft. Java, 1844. Stove annual. (B. R. xxxii. 68.)

I. p. alba (white). A garden name for *I. flaccida alba.*

I. pulcherrima (fairest). *fl.* red; peduncles two or three, axillary, one-flowered; spur filiform. July. *l.* alternate, ovate, setaceously serrated, glaucous beneath. *h.* 6ft. Bombay, 1848. Greenhouse annual. (B. M. 4615.)

I. repens (creeping). *fl.* bright yellow, large. Summer. *l.* small, very dark green. *h.* 1½ft. Ceylon, 1848. A compact-growing stove biennial, making an excellent basket plant. (B. M. 4404.)

FIG. 287. IMPATIENS ROYLEI, showing Top of Flowering Branch, detached Flower, and Young Seed Vessel.

I. Roylei (Royle's).* *fl.* purple, many-umbelled or short-racemed; standard two-lobed; wings broad; lip succate, very obtuse; spur short; peduncles sub-terminal. August. *l.* usually opposite and whorled, lanceolate or ovate-lanceolate, sharply serrate. *h.* 10ft. India, 1839. Hardy annual. See Fig. 287. (B. M. 4020, and B. R. xxvi. 22, under name of *I. glandulifera.*)

I. R. macrochila (large-lipped). *fl.* rose, terminal, umbellate. July and August. *l.*, upper ones alternate, ovate-lanceolate, serrate; petioles glandular. *h.* 8ft. North India, 1838. Plant erect. Hardy annual. (B. R. 1840, 8.)

I. R. moschata (musky). *l.* alternate and whorled, coarsely serrate, less glandular.

I. scabrida (scabrid). *fl.* yellow, with minute purple dots; peduncles two to six-flowered. July. *l.* lanceolate, cuspidately serrated, acuminated, pubescent. Stem purplish, slightly angular. *h.* 2ft. to 3ft. Himalaya, 1827. Hardy annual. SYN. *I. tricornis.* (B. M. 4051; B. R. 1840, 9.)

I. setacea (bristly). A synonym of *I. chinensis.*

I. Sultani (Sultan of Zanzibar's).* *fl.* scarlet; petals quite flat; dorsal (or standard) obovate-orbicular, retuse, rather smaller than the others; lateral petals cleft to the base into obovate-cuneate equal flat lobes; lip drawn out into a long, slender, curved spur. *l.* ovate-lanceolate, acuminate. Zanzibar. A glabrous, erect-branched, rather succulent, stove perennial herb, and an almost continuous flowerer. (B. M. 6643.)

I. S. alba (white). A garden name for *I. flaccida alba.*

I. tricornis (three-horned). A synonym of *I. scabrida.*

I. Walkeri (Walker's).* *fl.* scarlet (except two green outer sepals), 1½in. to 1¾in. long; anterior sepal somewhat pitcher-shaped, elongated, contracted below the mouth, attenuated at the other extremity into a conical, subulate, incurved spur; peduncles erect; pedicels long, slender. Winter. *l.* deep green, penni-nerved, 3in. to 4in. long, petioled, scattered, ovate or ovate-lanceolate, acuminate, tapering at base; margins serrated, and tipped with soft bristles. Stem deep purple, erect. *h.* 1ft. to 1½ft. Ceylon. Stove perennial. (B. M. 5237.)

IMPLEXOUS. Entangled; interlaced.

IMPREGNATION. The fertilisation of the ovule by the pollen-tubes. *See also* **Hybridising.**

INARCHING. *See* **Grafting.**

INARTICULATED. Without joints.

INCARVILLEA (named after P. Incarville, a Chinese Jesuit, and a botanical correspondent of Bernard de Jussieu, in the year 1743). ORD. *Bignoniaceæ.* A

Incarvillea—*continued.*

genus, as now understood, containing three or four species of erect, greenhouse or hardy glabrous perennials, with racemose, bilabiate, tubular flowers. A mixture of loam, peat, and sand, or any light rich soil, will suit them. Propagated by divisions of the roots, or by seeds.

I. compacta (compact). *fl.* bright rose-pink, disposed in clusters; corolla about 2½in. in length, funnel-shaped. Summer. *l.* unequally pinnate, with short, ovate-acute segments, fleshy, tufted or ultimately scattered. North-west China, 1881. Hardy. (R. G. 1068.)

I. Koopmannii (Koopmann's). A synonym of *I. Olgæ.*

FIG. 288. INCARVILLEA OLGÆ, showing Flowering Shoot and detached Single Flower.

I. Olgæ (Olga's).* *fl.* bright rose, produced in the upper axils, on very short stalks; corolla campanulate-infundibuliform, with short, rounded, spreading lobes. Summer. *l.* opposite, pinnate; segments narrow-oblong, pinnatifid. *h.* 3ft. to 4½ft. Turkestan, 1880. A very handsome hardy perennial. SYN. *I. Koopmannii.* See Fig. 288. (B. M. 6593; R. G. 1001.)

I. sinensis (Chinese). *fl.* nearly sessile, in loose terminal racemes; corolla scarlet, large. *l.* alternate, bi- or tripinnate; segments narrow. *h.* 1ft. to 2ft. China. Greenhouse.

INCISED. Regularly divided by deep incisions.

INCLINING. Bending forwards.

INCLUDED. Inclosed in anything.

INCOMPLETÆ. One of the divisions into which—for the requirements of systematic botany—the great class of Dicotyledons is divided. The corolla, and often calyx, is quite absent, and "suppression" is carried to its greatest extent. Some of the more important of the orders belonging to the division *Incompletæ* are: *Coniferæ*, *Cupuliferæ*, *Salicineæ*, and *Urticaceæ*.

INCURVED. Curved inwards.

INDEFINITE. In great number; stamens are said to be indefinite when they are too numerous to count.

INDEHISCENT. Not opening in a definite manner when ripe.

INDIAN BLUE. *See* **Nymphæa stellata cyanea.**

INDIAN CORN. *See* **Zea.**

INDIAN CRESS. *See* **Tropæolum majus.**

INDIAN FIG. *See* **Opuntia.**

INDIAN GARLAND FLOWER. *See* **Hedychium.**

INDIAN HAWTHORN. *See* **Raphiolepis.**

INDIAN MULBERRY. *See* **Morinda.**

INDIAN PINK. *See* **Dianthus chinensis.**

INDIAN SHOT. *See* **Canna.**

INDIARUBBER PLANT. *See* **Ficus elastica.**

INDIGOFERA (from *indigo*, a blue dye, and *fero*, to bear; on account of some of the species yielding the well-known dye). Indigo. ORD. *Leguminosæ.* A genus comprising 220 species of stove, greenhouse, or half-hardy herbs, shrubs, or sub-shrubs, the greater number of which belong to the African continent, but abound also in America and Asia, and a few extend to Australia. Flowers usually pink or purple, in axillary racemes or spikes; keel of corolla furnished with a subulate spur on both sides, at length usually bending back elastically. Leaves impari-pinnate or pinnate, rarely digitate or simple. Very few species of this large genus are in cultivation. They are propagated by seeds; or by firm cuttings of young shoots, inserted in sandy or peaty soil, under a hand glass, in a slight heat, in summer. *I. decora* is a very desirable greenhouse shrub of moderate growth, which flowers profusely in summer, and is one of the species most generally cultivated. The plants should be cut in, about February or March, and started in a little warmth, when any repotting should also be attended to. They may be hardened, to grow in a cold frame afterwards, and watered freely throughout the growing and flowering period. The wood should be thoroughly ripened by exposure, in autumn, and a season of rest allowed in winter. *I. Gerardiana* forms a compact bush in the open shrubbery, and is also well adapted for covering walls, where it makes better growths, and flowers more freely. It is one of the hardiest species. Indigoferas succeed in a somewhat rough compost of turfy loam and leaf soil. To insure an abundance of flowers, the wood must be well ripened.

I. angulata (angular). A synonym of *I. australis.*

I. Anil. Anil. *fl.* pinkish; racemes axillary, shorter than the leaves. Summer. *l.* pinnate, with three to seven pairs of oval or oblong leaflets, hardly pubescent beneath. Stems shrubby, erect. *h.* 2ft. to 4ft. West Indies and tropical America, previous to 1731. Stove. (B. M. 6506.)

I. atro-purpurea (dark purple). *fl.* dark purple, crimson; racemes axillary, slender. August. *l.* pinnate, with five to seven or ten pairs of oval, retuse, mucronulate leaflets, rather undulated on margins. *h.* 5ft. Nepaul, 1816. Half-hardy shrub. (B. M. 3065; B. R. 1744.)

I. australis (Southern).* *fl.* rose-coloured; racemes rather shorter than the leaves. March to June. *l.* pinnate, having five to seven pairs of elliptic-obtuse, glabrous leaflets. Stem shrubby. *h.* 3ft. to 4ft. Australia, 1790. A handsome greenhouse species, with a neat habit; it is an excellent pot plant. SYNS. *I. angulata* (B. R. 991), *I. sylvatica* (B. M. 3000). (B. R. 386; L. B. C. 149.)

I. decora (comely). *fl.* reddish, disposed in dense racemes. Spring and summer. *l.* pinnate; leaflets two to six pairs, ovate, obtuse, mucronate, and with a few peltate hairs beneath. *h.* 3ft. China, 1844. Greenhouse evergreen shrub. (B. M. 5063; B. R. 1846, 22.)

I. d. alba (white).* An elegant variety, with long racemes of white flowers; it thrives well, and proves almost hardy, when planted against a wall.

I. Dosua (Dosi-swa). *fl.* bright red; racemes axillary, shorter than the leaves. Summer. *l.* pinnate, having ten to fifteen pairs of oval, retuse, mucronulate leaflets, which, as well as the branches, are clothed with rufescent hairs on both surfaces. *h.* 1½ft. India. Greenhouse.

I. floribunda (profuse-flowering). A garden name of *I. Gerardiana.*

I. Gerardiana (Gerard's).* *fl.* pale red, in distinctly-stalked, twelve to twenty-flowered racemes. July. *l.* shortly stalked, pale grey-green, glaucous and hoary below. India. A low, much-branched shrub, perhaps the hardiest species. SYN. *I. floribunda*, of gardens. (B. R. 1842, 57, under name of *I. Dosua.*)

I. sylvatica (sylvan). A synonym of *I. australis.*

I. tinctoria (dyer's).* *fl.* with a pale vexillum, and red keel and wings; racemes axillary, shorter than the leaves. July. *l.* pinnate, with four to seven pairs of obovate leaflets, which are pubescent beneath. Stem suffruticose, erect. *h.* 4ft. to 6ft. East Indies, 1731. Stove. This is the most universally cultivated of all the species.

I. violacea (violet). *fl.* purple, red; racemes axillary, longer than the leaves. Summer. *l.* pinnate, with five pairs of obovate-elliptic, flat, slightly pubescent leaflets. *h.* 5ft. East Indies, 1819. Half-hardy. (B. M. 3348.)

INDUMENTUM. The hairy covering of plants, of whatever kind.

INDUPLICATE. Having the margins bent abruptly inwards, and the external face of these edges applied to each other without any twisting.

INDUSIUM. The membranous cover which overlies or underlies the sporangia of ferns. The name is also applied to the annulus of some fungals.

INERMIS. Unarmed; destitute of any kind of spines or prickles.

INFERIOR. Growing below some other organ. The ovary, or fruit, is said to be Inferior when it is crowned by the calyx, petals, and stamens.

INFLORESCENCE. The disposition of the flowers.

INFRACTOUS. Curved inwards.

INFUNDIBULIFORM. Funnel-shaped.

INGA (the South American name of one of the species). ORD. *Leguminosæ*. A genus comprising 140 species of stove unarmed shrubs or trees, natives of the warmer parts of South America, principally of Guiana and Brazil. Flowers usually white or yellowish, produced in spikes or nearly globular heads, from the axils of the leaves. Leaves abruptly pinnate, composed of from two to five or six pairs of rather large leaflets. The species, with the exception, perhaps, of *I. pulcherrima*, are very rarely seen in cultivation. They thrive in a compost of peat and loam, and plenty of moisture will be needed during the summer months, but scarcely any in winter. Increased by cuttings, made of the young shoots, in spring and summer, and inserted in sandy peat, under a bell glass, in heat.

I. macrophylla (large-leaved). *fl.* yellow. *l.* bipinnate, of two pairs; leaflets ovate, acute, smooth, shining above, a gland between each pair; petiole winged. *h.* 20ft. Cumana, 1815. (B. M. 5075.)

I. pulcherrima (fairest). *fl.* scarlet, disposed in solitary, pedunculate, pendulous heads. Summer. *l.* with four or five pairs of pinnæ; each pinna bearing from twenty to twenty-six pairs of small, linear, obtuse, closely imbricated, adpressedly-ciliated leaflets. Branches slender, spreading. *h.* 10ft. Mexico, 1846. (P. M. B. v. 147.)

INKBERRY. An American name for *Ilex glabra*.

INOCARPUS (from *is*, *inos*, a fibre, and *karpos*, a fruit; in reference to the fibrous envelopes). ORD. *Leguminosæ*. A genus comprising three species of stove evergreen trees, natives of the Pacific islands and the Indian Archipelago. Flowers yellow, in axillary spikes; calyx tubular; petals five. Leaves simple (one-foliolate), coriaceous, penninerved; petioles very short. The species require a compost of loam and peat. Cuttings of the half-ripened shoots will root in sand, in heat.

I. edulis (edible). *fl.* white; petals five, united to form a short tube. Summer. *fr.* a one-seeded fibrous pod. *l.* alternate. *h.* 20ft. South Sea Islands, 1793.

INSECTICIDES. The prompt destruction of injurious insects, immediately any are detected, is an important and essential operation to be performed in connection with all cultivated trees and plants. Insects of the most minute description increase with such rapidity, if left alone, that irreparable damage is soon caused to any subject they infest. An Insecticide is any composition prepared from ingredients destructive to insect life. Some Insecticides, too, are useful in checking or destroying low forms of parasitic plant life, such as Mildew, &c. To be effective and available for use on plants, it must be fatal to insects without in any way injuring the host. Plants which are leafless, and in a dormant state, will bear being washed with an Insecticide nearly or quite double the strength they could withstand when in full leaf; hence the importance of thoroughly cleaning plants, and also the house, during winter, when insects increase less rapidly than at other seasons, and are more concentrated on those parts of deciduous plants which remain. Tobacco, in one form or another, is, perhaps, the most useful substance entering into the composition of Insecticides. It may be soaked in water, for

Insecticides—*continued.*

dipping plants, and the preparation made to any strength desired; used as a dry, ground powder, for dusting over the leaves or points of shoots; or burnt in houses, for the destruction of insects by the smoke. Soft Soap is a cheap and excellent Insecticide, used in many gardens to the exclusion of all other preparations. It may be readily dissolved in water at any time, and to any required strength, according as various plants may be able to withstand it. An ounce, or even less, to a gallon of water, will generally be sufficiently strong to use for sponging the leaves, or for dipping plants in. Nicotine Soap has some of the properties of tobacco; it is a good Insecticide, and may, when purchased, be readily prepared for use. Gishurst Compound, an old and well-known composition, in frequent use, and Fir-tree Oil, are soluble and useful Insecticides for general purposes. Directions for preparing them accompany each box or bottle sold; and it is rather important that they be followed, as far as possible, especially in the use of soft water. Petroleum—erroneously called paraffin, a different article—is very destructive, especially to Mealy Bug; but, unfortunately, it is insoluble in water, and requires very careful application. A small wineglassful to three gallons of water, is not too much in many instances; but it must be thoroughly mixed with the water by constant agitation, preferably with a syringe. Hellebore Powder is sometimes employed as an Insecticide, more particularly for the destruction of the Gooseberry Caterpillar; but, being a deadly poison, it must be carefully handled, and be afterwards washed off with clean water. Flowers of Sulphur, used either dry or mixed with water, is one of the best things for destroying or preventing the spread of Mildew. There are various other Insecticides sold, but those already noticed are mostly in general use, and answer their purpose, when properly applied, so far as can be expected of preparations. Their use and effect with, and on, different plants can only be treated of individually and after experience gained from experiments made according to the directions usually accompanying the respective preparations.

It is much preferable to avoid, as far as possible, the use of Insecticides, especially those applied in a liquid state, as it is frequently a difficult matter, even with careful precautions, to kill insects entirely, without, at the same time, causing injury to the plants infested by them. If due care and attention be paid to watering, syringing, and ventilation, as well as proper repotting, &c., insects will not give much trouble. When the use of an Insecticide becomes requisite, it should be promptly applied, choosing an evening or a dull day for the operation, and afterwards removing all traces by clear water. Insect Powder—of which the basis is composed of the dried and powdered leaves and flowers of *Pyrethrum roseum* and *P. cinerarifolium*—is effective when dusted on infested plants.

INSECTS. No other class of the animal kingdom is of so much interest and importance to those engaged in gardening, or in farming, as are Insects, which, in in their countless forms and modes of life, force themselves upon the notice of even the least observant. The destruction they cause to field and garden produce is great, and at times excessive; and these attacks can be met successfully only when means are used that are based on a knowledge of the habits of the injurious species. But while Insects are more conspicuous because of the injuries they inflict on our fields and gardens, we must not forget that many kinds are beneficial to plants, either by the services they render in conveying pollen from flower to flower, and thereby securing the production of healthy offspring to the plants; or by feeding on, and thus destroying, the injurious kinds of Insects. Were it not for the aid rendered to us by the parasitic species, we must often be helpless to check the ravages

Insects—*continued.*

of the others, which, despite this aid, are often but too wide-spread and serious.

Space will not here permit of more than a very brief sketch of some of the leading points in the structure and life-history of the class and of its leading orders, with a mere indication, in the most general terms, of the more conspicuous damage done by them, and of the means of remedy generally applicable; but fuller information will be found plentifully scattered through this work under the various headings referred to below.

The word "Insect" literally means any animal which has the body so divided as to seem cut into successive parts, usually resembling rings of hard substance, connected by soft skin. The name has been used to include all the animals with bodies resembling a row of joints, even Worms having been at one time included among Insects, along with Spiders, Mites, Crabs, Woodlice, and Centipedes. At the present time, the name is confined to a considerably smaller group of animals—the true Insects—though some authorities still include with these the other groups named above, except Worms. In this restricted sense, the class of Insects is composed of animals that possess a jointed body made up of a number (twenty or twenty-one) of rings of horny substance (chitine), connected by skin, so united as to form three great divisions in the body, viz., the head, the thorax, and the abdomen; that have antennæ, or feelers, on the head, and three pairs of horny jointed legs, and usually two pairs of wings, on the thorax; that breathe by tubes (tracheæ) all through the body and limbs, which tubes open on the surface of the body by small holes (spiracles); and that, in course of growth, pass through a succession of changes (metamorphoses), beginning with the egg, and going on through the stages of larva and pupa (chrysalis), before assuming the perfect condition (imago), in which alone they present all the characters enumerated above. This series of changes may be of two kinds. In one, the larva, on emerging from the egg, resembles the mature Insect in form, and differs from it only in size, and in the entire absence of wings; while the pupa differs from the mature Insect only in the wings, though indicated, being small and rudimentary. Both larva (see Fig. 314) and pupa are also sexually immature. This kind of metamorphosis is said to be incomplete. Complete metamorphosis differs

FIG. 289. LARVA OF SMALL CABBAGE BUTTERFLY.

FIG. 290. LARVA OF LEOPARD MOTH.

from this in the larva (see Figs. 289, 290, and 291) being quite unlike the mature Insect. Very generally, it resembles a worm in its form. It may have a distinct head, and the rings of the body, though like one another, may differ in the three immediately behind the head each bearing a pair of horny jointed legs, while those of the hinder part of the body may bear skinny suckers (prolegs)—the number varies considerably, and they may be quite absent. Larvæ of this type (see Fig. 291) are called Caterpillars, and are met with among the Butterflies, Moths, and Sawflies. Another group of Insects, in the larval state, are footless creatures, frequently

Insects—*continued.*

scarcely showing even a trace of a head. Such larvæ are familiar to everyone under the name of maggots or grubs, *e.g.* those of Bees, Flies, &c. (see Fig. 311). The pupæ of Insects that undergo a complete metamorphosis are not able to move about or to feed, but remain helpless for a longer or shorter period, while changes are going on within, which result in the development of the perfect insect (imago), showing all the distinctive characters already set forth. These quiescent pupæ differ much from the larvæ (see Fig. 309), as they show the

FIG. 291. LARVÆ OF ROSE-LEAF SAWFLY.

future limbs (antennæ, legs, and wings) of the imago, though these parts are still useless, and of very small size. The Butterflies and Moths, while pupæ, have the whole body enveloped in a hard crust, which binds down all the parts immovably to the body, leaving only a slight power of movement in the hinder rings. When the pupa is helpless, its safety is generally provided for by the larva forming a cell or cocoon of silk, earth, or other material, compacted with a cement from its mouth, in which the pupa lies concealed till the imago breaks out from it, and crawls to the outer air, with wings at first crumpled and useless, but soon expanding and becoming firm to carry it in flight through the air. Whatever the degree or kind of metamorphosis undergone by it, the Insect, in its progress from the egg to maturity, grows frequently with enormous rapidity. The outer coat of the body is too rigid to allow of the corresponding extension in it; but the difficulty is met by the larva several times (four times or oftener) throwing off its skin. The old skin separates from the body of the larva, it splits along the back in front, and the larva wriggles its way out, frequently with a skin of a very different colour from that in which it had previously shown itself. In like manner, the skin of the pupa bursts to set free the imago.

The sudden and mysterious appearance of certain kinds of Insects at one time led to the belief that they must be produced by spontaneous generation from dead and decaying substances; but the progress of accurate researches into their life-histories has proved conclusively that they always originate from parents, though at times, in the case of certain Insects, *e.g.*, several of the true Gall-flies of the Oak-tree, the parents and the immediate offspring may differ considerably in appearance. The females produce eggs, except in a few groups, such as the Aphides, in which the young Insects may be brought forth, not sexually by eggs, but by a process of budding. In the case of a few other Insects, the eggs are hatched while still within the body of the mother, which thus gives birth to living young or larvæ. The fact that Insects are always produced from parents, renders it of the utmost importance, when dealing with the injurious species, to become familiar with the habits of the females as well as of the larvæ, which latter are usually the destructive agents, and are therefore the more

Insects—*continued.*

generally observed by gardeners and agriculturists. Such a knowledge frequently enables us to devise means of warding off the damage that would otherwise be unavoidable, and of assailing the destroyers in the most effective way.

The following details of structure have reference only to mature Insects:

Mouth. In its essential structure, the mouth consists of certain parts, six in number, though some of them bear appendages. These parts may undergo great modification, and may be adapted to very different uses, so as to be hardly recognisable when compared with the mouth of one of the more typical forms. The chief modifications will be treated of under the various groups of Insects; it is here only necessary to describe the parts of the mouth of a Beetle, selecting this as a type because of all the parts of a fully-developed mouth being well seen in Beetles. In them, the mouth is formed by an upper lip (labrum), two pairs of jaws working horizontally like the blades of scissors (called mandibles and maxillæ, or upper and lower jaws respectively), and a lower lip (labium). The mandibles are specially adapted for cutting the food to be taken into the mouth. The maxillæ are not so strong, and often bear tufts of hair to serve as brushes. Each also bears a jointed body (palpus), which seems to serve as a sense-organ. The lower lip bears a pair of similar jointed bodies (labial palpi).

Limbs. The middle division of the body (thorax) bears the limbs, viz., three pairs of jointed legs on the lower surface or breast, and two pairs of wings, attached to the upper surface of the two hinder of the three rings of which, closely consolidated, the thorax is made up. The legs are generally present, though, in some Insects, one or more pairs may be ill-developed, or even entirely absent. They vary in relative size, and in the number of parts of which they are made up; but they are of less importance in giving characters for the orders than are the wings. The latter organs, in their typical condition, *e.g.*, in *Hymenoptera* or in *Lepidoptera*, are two pairs of broad membranes, supported upon nervures traversed by breathing-tubes (tracheæ). The upper or front pair almost always exceed the lower or hind wings in size and in complexity of neuration, but resemble them as regards texture and general appearance. In several groups, however, this typical structure is departed from, as will be more fully stated below. Not a few Insects either have the wings small and utterly inefficient (as the female Winter Moth, see Fig. 294), or altogether absent (as Fleas and many other parasitic Insects).

Periods of Destructive Activity. As a general rule, the larvæ, during their rapid growth, are far more hurtful to vegetation than are the perfect Insects; in fact, certain of the groups of Insects are unable, in the perfect state, to feed upon plants, save by sucking up the nectar or honey contained in the flowers, *e.g.*, the whole group of *Lepidoptera*. Yet these same Insects, in the larval stage, were once provided with strong jaws, well fitted to cut their food, and then probably fed voraciously upon their food-plants. But among the groups provided with a mouth suited for chewing (*e.g.*, Beetles and *Orthoptera*), or for puncturing the tissues of plants and sucking the juices (*Hemiptera*, particularly Aphides), the perfect Insects may be almost as destructive as the larvæ; indeed, some kinds are not injurious to man except in the mature condition.

General methods of prevention and of remedy against damage from Insects, may be treated of here; but details as to these practices must be sought under the special headings. The methods employed to prevent attacks must depend on the habits and modes of life of the Insects to be dreaded. Of course, the destruction of the creatures, either as larvæ, pupæ, or mature Insects, before they have laid their eggs, is the most certain means. This may be effected either by direct efforts, such as hand-picking, or applications of poisonous solutions or gases to them; or else — and probably with greater, if less apparent, success—by making use of the natural means of checking their undue increase. Among the most efficient of these natural means are birds and parasitic Insects, both of which destroy vast multitudes of the more hurtful kinds in all their stages. Much has been written, and earnest have been the disputes that have been waged, regarding the relation of birds to agriculture and to gardening. While some writers have represented them as frequently most destructive to the crops and to fruit-trees, others have as strenuously upheld their great value as natural guardians of these crops and fruit-trees from the ravages of swarms of Insect foes. In these, as in so many other disputes, the truth probably lies between the extremes: but, while admitting, as we must admit, that birds are, at certain times of the year, more hurtful than beneficial to farmers and gardeners, yet the danger from them at these times may be comparatively easily guarded against; while the benefits conferred by them, during the rest of the year, are so great as far to outweigh any damage done by them. It must be remembered, moreover, that injury is done only by those birds that feed on fruits or seeds, such as blackbirds, sparrows, and many finches; or on roots or tubers, such as rooks; and that even these birds almost all feed largely on Insects also. On the other hand, many species of slender-billed birds may be said to live exclusively on Insects throughout the year, or such part of it as they spend with us. Some birds, like the bullfinch, are in the habit of pulling off the young buds of the fruit-bearing bushes and trees; but this seems to be done in the search for larvæ hidden in the buds, and which, if left in them, would destroy them in any case. In like manner, the apparent injury done to trees by woodpeckers boring into the trunks, is not really such, as the holes are bored by the bird to reach and to extract the larvæ of Insects hidden away in tunnels in the wood, or between the wood and the bark, and which, if left there, would have done no less injury; while, if they had reached maturity, they would have reproduced their kind, to the further detriment of the trees.

Even more efficient than the birds, in reducing the numbers of the injurious kinds of Insects, are the parasitic species of Insects; though, from their small size and unobtrusive habits, they are readily overlooked, and the work done by them undervalued. Among these, some devour the Insects or suck out their juices as food. As examples of these may be noted the Ground Beetles, and the larvæ of

FIG. 292. LARVA OF LADYBIRD.

the Ladybird Beetles (see Fig. 292) and of the Lacewing Flies, which devour the Green Flies, or Aphides, in myriads. Other insects (*e.g.*, some Solitary Wasps) carry off small Caterpillars, &c., to serve as food for their offspring. But far more important than even these are the parasites that deposit their eggs upon or in the body of some Insect, generally a larva, there to disclose the grubs. The latter live in the interior of their host, eating the fat, but leaving untouched the vital organs, till at last, when growth has been completed by the parasites, they either form cocoons inside its body, or else burrow out through the skin, to become pupæ in some concealment, where, though helpless, they may remain safe. True parasites of this latter sort belong, with rare exceptions, to the *Diptera* or

Insects—*continued.*

Two-winged Flies (*Tachina* and allied genera), or to certain divisions of the *Hymenoptera*. In this latter order, some groups, with very numerous kinds in each, are entirely, or

FIG. 293. ICHNEUMON FLY.

almost entirely, confined to parasitism (Ichneumons—see Fig. 293—and *Chalcididæ*), and many species in the other groups of the order are also parasites. In fact, it may almost be said that there are few Insects which are not preyed on by one or more (and frequently by many) of these minute parasites. It is hardly in our power to do anything directly to increase the numbers of these allies; but it is well to be able to recognise their general appearance, and to refrain from killing them.

In many cases, however, we must not trust to the efforts of birds and Insects to limit the numbers of our Insect foes. When their attacks are severe, it is necessary to remove or to destroy them more rapidly than can be done by natural agencies; and, though the methods employed must be varied to suit the special circumstances that call for them, yet the same methods are largely applicable for the destruction of many kinds of Insects. A few of the more generally useful may be mentioned here. Tobacco smoke is very fatal to many of the hurtful Insects, where these attack plants under cover, *e.g.*, in greenhouses. It is especially efficacious against Aphides. Either strong coarse tobacco, or the paper in which it has been wrapped, is burned in the place to be freed from the foe; the doors are all kept closed during the operation, and for some time afterwards. Infusions of tobacco, of Hellebore, or of other insecticides, are sometimes prepared, and are scattered over the plants by means of a watering pot or syringe. These applications are usually very fatal to larvæ feeding on such parts of plants as allow of the solution being properly applied to them, and they do not injure the host. Scale, and other Insects that lie closely adherent to leaves or branches, are seldom much affected by tobacco smoke, and they are best removed by washing the parts with water, or with solutions of soft soap or of poisonous substances; and the efficacy of the applications is increased by using a brush to put them on with. Several kinds of injurious larvæ are in the habit of living in groups, in or under webs. These are easily cleared away with the webs; and the whole should be destroyed, by burning or otherwise. Larvæ living in the interior of branches, or in galls, cannot be reached without removing the injured structures; and this is also usually the case with root-feeders. When a plant is withering without any apparent cause, the removal of the earth from its root will, at times, disclose the hidden larva that has been feeding there. Sometimes, also, larvæ feed at night on the leaves, and during the day hide themselves in the earth. Hence, the depredators can be detected only at night, by the use of a lantern. Many Insect larvæ roll up a leaf, or spin together two or three leaves, so as to form a protection for themselves against all means of destruction save hand-picking; but, fortunately, such larvæ are seldom fatal in their attacks; though, frequently, the plants become very unsightly under them. Trees and shrubs are attacked in this way more often than are herbaceous plants. A severe shaking will often cause a large number of the larvæ to drop from their tubes, and to hang suspended in the air by silken threads till the danger is past, when they remount by their threads. If a sheet is spread below

Insects—*continued.*

the tree, they may be shaken on to it, and then readily gathered to be destroyed. The mere shaking of the plant is not enough. Many larvæ (*e.g.*, those of Gooseberry Sawflies, of Winter Moth, &c., fall to the ground when full fed, there to burrow in order to form cocoons, and to become pupæ, within a very little distance of the surface of the ground. Soot, gas-lime, and other nauseous materials are often spread on the soil around the stems of trees and shrubs, to prevent the larvæ from burrowing in the immediate vicinity of the plants, and to destroy them by the poisonous properties of the substances. The pupæ may be greatly lessened in number by paring off and burning an inch or two of the surface soil in the autumn or winter. Opening the soil with a hoe or a rake is also useful, as it destroys some pupæ at once, and exposes others to the chance of being eaten by birds, and to unfavourable conditions during the winter. The females of some of the more hurtful Insects are wingless, or have wings so small as to be of little or no

FIG. 294. MALE, FEMALE, AND CATERPILLAR OF WINTER MOTH.

use (as the Winter Moth, see Fig. 294); they must, therefore, crawl up the plants on which they lay their eggs; and their path may be barred by placing a ring of any sticky substance on the soil around the base of the stem, or around the stem itself. Tar, or mixtures of tar with materials to prevent its drying quickly, have been used with success to form such barriers. Other methods of treatment, suitable to particular cases, will be found referred to under the names of the various insects. *See also* **Insecticides.**

The class *Insecta* has been divided into certain great groups, called "orders," by means of characters taken mostly from the structure of the mouth and of the wings, and from the kind of metamorphosis they pass through in their growth. These orders are well distinguished from one another, and there is usually not much difficulty in determining the group to which any Insect belongs. Some orders are of far greater importance to gardeners than are others; and to them the following remarks are confined. These orders are as follows:

Coleoptera, or *Beetles*. These have the mouth formed

Insects—*continued.*

for biting, with all the parts well developed; the body is usually incased in a hard crust; the front wings are modified to form hard coverings (elytra) extending over the hinder part of the body, and serving to protect the hind

FIG. 295. ROSE-CHAFER, with Hind Wings extended.

wings, which remain membranous for flight (see Fig. 295). The metamorphosis is complete, *i.e.*, the larva is very

FIG. 296. LARVA OF COLORADO BEETLE.

FIG. 297. COLORADO BEETLE.

unlike the adult Insect (see Figs. 296 and 297), and the pupa is helpless. At times, the larvæ of Beetles are hurtful (*e.g.*, those of the Click Beetle and of the Colorado Beetle); but the mature Insects are more often to be dreaded. *See also* **Cockchafers, Ladybirds,** and **Turnip Fly.**

Several kinds of Beetles are useful to gardeners, since they feed on hurtful Insects, either as larvæ, or in the perfect state. Of these useful forms we may mention

FIG. 298. COMMON GROUND BEETLE.

the following: The Ground Beetles (see Fig. 298) feed mostly on Insects, though some of them are partly vegetarians, and *Harpalus ruficornis* has been found eating Strawberries in large numbers. The Tiger Beetles, and the Devil's Coach Horses or Rove Beetles (see Fig. 299), feed largely upon decaying matter; but many kinds are of much assistance by destroying noxious insects. The Glow-worm (*Lampyris noctiluca*), in the larval state,

Insects—*continued.*

feeds on snails, mostly of the genus *Helix*, following them into their shells to devour them. It removes the slime encountered in this mode of life, by means of a kind of brush specially suited to its needs. The larvæ

FIG. 299. DEVIL'S COACH HORSE.

of the Ladybirds are very useful because of the number of Green Flies eaten by them. The modes in which Beetles inflict injury on garden and field produce, are very various. Frequently, the roots are attacked, and much injured, or entirely destroyed, usually by larvæ,

FIG. 300. GRUB OF COCKCHAFER.

e.g., of the Cockchafer (see Fig. 300). The stems are injured, chiefly by those kinds (Bark Beetles) that bore between the bark and the wood, separating the bark, which soon dies. A few make galls, on roots or stems, *e.g.*, Cabbage Weevil, or in seed vessels. Others attack the leaves, either while larvæ (Lily Beetle), or as Beetles (Turnip Fly); while others live as larvæ in the seed vessels, eating out the contents of the seeds, and thus rendering the crops a failure while in the soil, or after they have been harvested, *e.g.*, Bean Beetle.

Orthoptera. In this order are included Insects with mouths fitted for biting, wings net-veined, front wings like parchment in thickness, long and narrow, serving to protect the large membranous hind wings; metamorphosis incomplete, the larvæ resembling the parents except in

FIG. 301. HOUSE CRICKET.

size, and in having no trace of wings. This order includes Locusts, Crickets (see Fig. 301), Grasshoppers (see

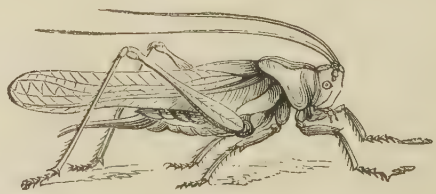


FIG. 302. GREEN GRASSHOPPER.

Insects—*continued.*

Fig. 302), Cockroaches (see Fig. 303), and Earwigs; though some place the last-named Insects in a separate

FIG. 303. FEMALE COCKROACH.

order, called *Euplexoptera*, because of the very neat folding of the hind wings below the front ones. The *Orthoptera* are destructive during every stage after leaving the egg, and in warm countries they do excessive damage at times. In Britain, they cannot be regarded as of great consequence; though Cockroaches may gnaw the greenhouse plants, and Earwigs are rather hurtful to florists' flowers, and require to be kept in check (*see* **Cockroaches, Crickets,** and **Earwig**). With the *Orthoptera* may also be classed the genus

FIG. 304. THRIPS (magnified).

Thrips (see Fig. 304)—a genus of very small Insects, which live in flowers, and gnaw the surface of the petals (*see* **Thrips**).

Neuroptera are at once far less numerous in species and in individuals, and practically less important than are the orders already discussed. None of the Insects in it can be said to be hurtful to plants. On the other hand, they are frequently of much service, since several of them feed on Insects, and destroy large numbers of injurious kinds. The order is characterised by the possession of four wings, all alike membranous, and supported on a complex network of nervures; a mouth fitted for biting. Certain of the sub-orders undergo only an incomplete metamorphosis, while in others the metamorphosis is complete. The larvæ are provided with six jointed legs. *Neuroptera* are mostly carnivorous, alike in the larval state and when mature. Among the better-known forms may be noted Dragon Flies, Hemerobius, and Lacewing Flies.

Hymenoptera have the wings all membranous and naked, and supported on branching nervures, the hind wings being the smaller; the wings bear no scales. The mouth has jaws for biting; but in some of the sub-divisions of the order, certain parts of the mouth are modified to serve for licking up honey from flowers (in Bees, Wasps, &c.). They all pass through a complete metamorphosis. The larvæ vary much in form, often being like maggots (Bees, &c.), while the Sawflies have larvæ not unlike the caterpillars of Moths. Sawflies are very injurious to plants, many of them being hurtful to garden and field produce (Turnip Sawfly, Gooseberry Sawflies, &c.). Some of the Sawflies make true galls on Willows; and many of the *Cynipidæ*, or Gall-flies (see Figs. 305 and 306), make galls on Oak, Maple, Roses, &c. Most of the *Hymenoptera*

Insects—*continued.*

are of much use in limiting the number of injurious Insects; and among these useful species the Ichneumons hold the first place. In the mature state, none of the

FIG. 305. GALLS AND INSECTS OF RHODITES ROSÆ, showing (1) Entire Bedeguar Gall; (2) Bedeguar, cut open; (3) Grub, natural size; (4) Head of Grub, magnified; (5) Pupa, magnified; (6) Insect, magnified.

Hymenoptera can be said to be really injurious to plants; while many are of great value in conveying pollen from flower to flower. However, Humble Bees are found at times to injure the flowers, by boring through the tube

FIG. 306. OAK GALL-FLY (magnified). The figure below, and to the right, represents the hinder rings of the Abdomen, and the Ovipositor, which serves to pierce the plant tissues, still more magnified.

of the corolla to gain readier access to the honey contained therein. *See also* **Ants, Galls, Honey Bee, Humble Bee, Ichneumon Flies,** and **Sawflies.**

Lepidoptera have the wings usually large (see Figs. 307 and 308), membranous, and covered all over with small scales; the mouth is of no use for biting but has the lower jaws (maxillæ) prolonged, so as, when placed together, to form a tube, adapted for sucking honey from flowers. The metamorphosis is complete. The larvæ (see Figs. 309 and 310) are of the form known as Caterpillars; and, apart from points of minor importance, vary chiefly in the number of sucker feet on

Insects—*continued.*

FIG. 307. LARGE WHITE CABBAGE BUTTERFLY.

the hinder rings of the body. This order includes the Butterflies and Moths. They are not injurious in their

FIG. 308. FEMALE GIPSY MOTH.

mature condition; but all the larvæ feed on plants, and many of them are very hurtful in gardens. *See also*

FIG. 309. CATERPILLAR OF LARGE CABBAGE BUTTERFLY.

Hybernia, Tortrix, Turnip Moth, Winter Moth, and others referred to above.

FIG. 310. CODLIN MOTH AND GRUB.

Diptera, or Two-winged Flies, have only one pair of wings, which are membranous and naked, with comparatively few nervures. The hind wings are replaced by

Insects—*continued.*

very small stalked knobs (halteres or poisers). The mouth varies, being in some suited for sucking, in others for biting; in many, the jaws are fitted to pierce the skin of animals, and thereafter to form suckers for drawing out the blood. The metamorphosis is complete. The

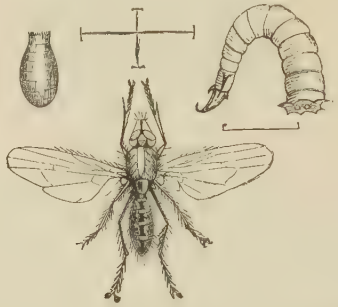


FIG. 311. ONION FLY, LARVA, AND CHRYSALIS, magnified.
(The lines alongside indicate the natural sizes.)

larvæ are maggots or footless grubs (see Fig. 311). They vary exceedingly in mode of life, many of them living in the interior of roots, stems, or leaves of plants; others form galls on plants; others feed on decaying matters; while yet others live as parasites in the bodies of animals, especially in Insects. Others (*Syrphidæ*), as larvæ, feed on the Aphides, and aid in reducing their numbers. The

FIG. 312. CRANE FLY.

larvæ of the Crane Flies (see Fig. 312) are but too well known to farmers under the names of Grubs and Leather Jackets. The Gnats live in water during their larval condition; the pupæ are very generally oval brown bodies. The *Diptera* are seldom of large size. *See also* **Crane Fly, Onion Fly,** and **Syrphus.**

FIG. 313. BEAN APHIS.

a, Female (magnified); *b*, Male (natural size and magnified).

Hemiptera have the mouth in the form of a beak, turned down so as to lie against the breast when not in use, but capable of being driven into their food when desired. This beak usually consists of a sheath, in which lie four bristle-like pieces, the whole serving for a sucker to draw in the juices on which they feed. The metamorphosis is incomplete, except in the male Scale insects. The wings are different in the two great sub-orders, and a great many of the Insects have no trace of wings. The sub-orders are:

Heteroptera, or *Plant Bugs*. The hind wings of these are

Insects—*continued.*

membranous, and hidden under the front ones. The latter have the half nearer the body leathery, that farther from the body membranous, giving the appearance of the wings being in halves, whence the name *Hemiptera*, or half-winged insects. The name *Heteroptera* refers to the dissimilar appearance of the two halves. In this sub-order, many of the species are more or less parasitic;

FIG. 314. FROG HOPPER, showing Larva, Frothy Secretion, and perfect Insect.

while among those that feed on plants, there are few that can be said to be conspicuously hurtful.

Homoptera have the wings all membranous and naked, with few supporting nervures, and often resemble small *Hymenoptera* in general aspect (see Fig. 313). A great many species are wingless, or, at least, have wing-

FIG. 315. GRAPE OR VINE LOUSE, showing (A) Infested Vine Root; (B) Portion of Leaf, with Galls; (C) Subterranean Form of Female (magnified).

less individuals as well as winged (see Figs. 313 and 315). The name *Homoptera* refers to the front wings being alike throughout (see Figs. 313 and 314). The insects are mostly very small, but include many injurious forms. *See also* **Aphides, Frog Hopper, Grape Louse,** and **Scale Insects.**

INSECTS, FERTILISATION BY. *See* **Fertilisation by Insects.**

INTEGERRIMUS. Entire; perfectly free from division of the margin or other part.

INTERNODES. The intervening space between two nodes.

INTERPETIOLAR. Between the petioles.

INTERRUPTED. Not continuous.

INTRORSE. Turned towards the axis to which it appertains; *e.g.*, an anther when its valves face the centre of a flower.

INULA (the old Latin name used by Horace, &c., said to be another form of *Helenion*). ORD. *Compositæ.* A genus comprising about fifty-six species of hardy

Inula—*continued.*

herbaceous plants, natives of Europe, Asia, and Africa—few being found between the tropics. Flower-heads yellow; rays rarely white; involucre hemispherical, imbricated, with the scales spreading at the points; ray-florets

FIG. 316. INULA GLANDULOSA.

numerous, ligulate, linear; disk-florets very numerous, perfect, tubular; receptacle flat, or nearly so, areolate or honeycombed. Leaves radical or alternate, entire or

FIG. 317. INULA HELENIUM.

serrate. Only a few species of this genus are worth growing. They are of very easy culture in common garden soil. Some of the more vigorous are suitable for

Inula—*continued.*

naturalising in the wild garden. Increased readily by divisions, or by seeds.

I. glandulosa (glandular).* *fl.-heads* yellow; scales of involucre lanceolate, villous. July and August. *l.* sessile, oblong, obsoletely serrated; the serratures glandular. Stem hairy, one-headed. *h.* 2ft. Caucasus, 1804. See Fig. 316. (B. M. 1907; B. R. 334.)

I. Helenium (Helenium). Elecampane. *fl.-heads* bright yellow, large, solitary, terminal. Summer. *l.* ovate, serrate, rugose, stem-clasping, downy beneath; root ones stalked. Stem furrowed, branched and downy above. *h.* 3ft. to 4ft. Europe (Britain), Siberia. A strong-growing perennial. Formerly used as an aromatic and tonic; the rootstock is still used in a candied state. See Fig. 317. (B. M. Pl. 150.)

I. Hookeri (Hooker's).* *fl.-heads* faintly sweet-scented, 2½in. to 3½in. in diameter, shortly peduncled, terminating leafy branches; involucre broad, shaggy; ray-florets numerous, with slender pale yellow ligules, which are 1in. or more long, obtusely three-toothed at apex; disk-florets numerous; receptacle convex, papillose; pappus hairs dirty-white. September. *l.* bright green, 3in. to 4in. long, sessile, or narrowed into short petioles, oblong-lanceolate, acuminate, minutely toothed, hairy above, tomentose beneath. Stems sparingly branched. *h.* 1ft. to 2ft. Sikkim Himalayas, 1849. (B. M. 6411.)

I. Oculus Christi (Christ's eye). *fl.-heads* bright golden-yellow, about 3½in. across; involucre very downy. Summer. *l.* broadly lanceolate, obtuse, almost entire, or slightly toothed, rather downy. *h.* 1½ft. to 2ft. Eastern Europe, &c., 1759. A very ornamental perennial, with a neat habit. (J. F. A. 223.)

INVOLUCEL. A small involucre.

INVOLUCRARIA. Now included under **Trichosanthes** (which *see*).

INVOLUCRATE. Having an involucre.

INVOLUCRE, INVOLUCRUM. A ring or rings of bracts which surround several flowers. The term is also used as synonymous with the Indusium of ferns.

INVOLUTE. Rolled inwards.

IOCHROMA (from *ion*, violet, and *chroma*, colour; colour of flowers). SYN. *Chœnesthes.* ORD. *Solanaceæ.* A genus containing about fifteen species of greenhouse trees or shrubs, inhabiting Western tropical America. Flowers violet, blue, white, yellowish, or scarlet; calyx tubular, somewhat distended; corolla tubular, much longer than the calyx, and concealing the stamens. Leaves entire, often ample, membranaceous. For culture, *see* **Cestrum.**

I. fuchsioides (Fuchsia-like).* *fl.* drooping, large, handsome; corolla orange-scarlet, thrice as long as the calyx; tube elongated, nearly straight; peduncles shorter than the leaves, single-flowered. Summer. *l.* often fascicled, obovate, inclining to oval or oblong, very obtuse, entire, tapering at base into a short footstalk. *h.* 5ft. Quitinian Andes, 1843. A glabrous unarmed shrub. (B. M. 4149, under name of *Lycium fuchsioides.*)

I. grandiflorum (large-flowered). *fl.* rich purple, large; cymes simple, pedunculate, terminal, many-flowered, pendulous; corolla funnel-shaped; tube long, pubescent; throat sub-campanulate; limb large, five-lobed; lobes triangular, recurved. November. *l.* broadly-ovate, acuminate, pubescent above, very pale and sub-tomentose beneath. Branches terete, pubescent. Ecuador and Peru, previous to 1860. A very handsome shrub. (B. M. 5301.)

I. lanceolata (lanceolate).* *fl.* drooping, in supra-axillary terminal umbels; calyx unequally five-toothed; corolla rich deep purplish-blue, 2in. long, cylindrical, glabrous, dilated at the mouth into a short, five-toothed, spreading limb; pedicels filiform, pendent; stamens and style scarcely exserted. Summer. *l.* alternate, rather large, oval or elliptic-lanceolate, membranous, acute, entire, tapering below into a long petiole, glabrous with age. *h.* 4ft. to 5ft. Andes of Chili, 1847. A beautiful shrub. (B. M. 4338, under name of *Chœnestes lanceolata.*)

I. tubulosa (tubular-flowered). *fl.*, corolla blue, showy, tubular, with five short teeth. August. *l.* ovate, three or four times shorter than the corolla. *h.* 5ft. Tropical America, 1843. (B. R. 1845, 20.)

IONE (from *Ione*, one of the Nereids). ORD. *Orchideæ.* A genus containing three or four species, now referred to **Bulbophyllum** (which *see* for cultivation).

I. paleacea (scaly).* *fl.* 1in. long, drooping, in many-flowered, erect spikes; sepals pale green, red-striped; petals pale yellow-green, small, rounded, erose; lip red-brown, trowel-shaped, as long as the sepals, erose; column short; scape erect, stiff, slender, longer than the leaf. October. *l.* dark green, 6in. to 8in. long, 1in. broad, linear, obtuse, narrowed into a deeply channelled base, but hardly petioled. Pseudo-bulbs dark green, 1in. to 1½in. long, ovoid, smooth. *h.* 9in. Upper Assam, 1877. (B. M. 6344.)

IONIDIUM (from *Ion*, a Violet, and *eidos*, resembling; in allusion to the Violet-like flowers). SYN. *Solea.* ORD. *Violarieæ.* A genus comprising forty species of herbs or sub-shrubs, natives, for the most part, of sub-tropical America. Flowers solitary, having the small unequal sepals running into the peduncle at base; petals unequal, lower ones two or three times longer than the rest, carinately-concave. Leaves alternate, or rarely opposite. The roots of several of the species are of economic value, being used as substitutes for Ipecacuanha. Ionidiums are rarely seen in cultivation. The species described below require greenhouse treatment, and a peat and loam compost. Cuttings of the shrubby sorts will root in sand, under a bell glass. The herbaceous species may be increased by divisions, or by seeds.

I. capense (Cape). *fl.* white; sepals acute, ciliated. Summer. *l.* alternate, obovate, obsoletely-toothed, pubescent. Stems shrubby, erect. *h.* 6in. to 12in. Cape of Good Hope, 1824.

I. Ipecacuanha (Ipecacuanha). *fl.* white; peduncles axillary, solitary, drooping; lower lip very large, emarginate. July. *l.* ovate-oblong. *h.* 1½ft. South America, 1822. The roots of this species furnish what is termed White Ipecacuanha.

I. polygalæfolium (Polygala-leaved). *fl.* greenish-yellow or white; sepals ovate-oblong, acute, pubescent. Summer. *l.* opposite, lanceolate, rather entire. Stems shrubby, branched, diffuse, procumbent. *h.* 1ft. South America, 1797.

IONOPSIDIUM (from *Ion*, a Violet, and *opsis*, appearance; alluding to the resemblance to some of the tufted dwarf-growing Violets). ORD. *Cruciferæ.* A genus comprising two species of small hardy annual herbs, one from Portugal, and the other a native of Sicily and Algeria. Flowers violet, white, or flesh-coloured, small, on long peduncles; sepals spreading, equal at the base; pouch broadly oblong, laterally compressed. Leaves sessile or petiolate, spathulate or orbiculate, entire or three-lobed. *I. acaule*, the species introduced to cultivation, has an extremely neat habit, and rarely exceeds 2in. in height. It thrives on rockwork, and makes an extremely pretty pot plant for window gardening. Seeds may be sown in the open—preferably in pots—any time during spring and summer. This plant should have at all times a shady situation. It often reproduces itself year after year, by self-sowing.

I. acaule (stemless).* *fl.* lilac, or white tinged with violet. Summer and winter. *h.* 2in. to 3in. Portugal, 1845. (B. R. 1846, 51.)

IONOPSIS (from *Ion*, a Violet, and *opsis*, like; flowers resemble a Violet in form). SYNS. *Cybelion* and *Iantha.* ORD. *Orchideæ.* A genus of very pretty little epiphytal stemless orchids, requiring a stove temperature, natives of the West Indies and tropical America from Mexico to Brazil. About ten species have been described, but it is doubtful whether more than two or three are really distinct. Flowers small, panicled; sepals and petals connivent; lip large, fan-shaped, two-lobed at the apex. Leaves few, lanceolate. Pseudo-bulbs small. The only species much seen in cultivation is *I. paniculata.* It is a very difficult plant to grow, and is rarely brought to perfection. It succeeds best on a block, with a little live sphagnum around the roots, which require to be kept moist nearly all the year round. Similar treatment will answer for the other species.

I. paniculata (panicled). *fl.* snow-white or delicate rose-colour, scentless; scape panicled, 1½ft. high; petals obtuse; lip pubescent; lip rotundate, bilobed, much longer than the sepals. *l.* linear-lanceolate, keeled. Brazil, 1865. (B. M. 5541.)

I. tenera (tender). A synonym of *I. utricularioides.*

I. utricularioides (Utricularia-like). *fl.* white, with a pink stain at the base of the lip, racemose; sepals and petals acute, subequal; lip pubescent; limb bilobed, much longer than the sepals. *l.* rigid, acute, furrowed, keeled at the base. Tropical America. SYN. *I. tenera.* (B. R. 1904.)

IOSTEPHANE (from *ion*, violet, and *stephane*, a wreath; in allusion to the violet rays). ORD. *Compositæ.* A genus consisting of only two species of scabrous-pubescent herbs, natives of Mexico. *I. heterophylla* is a very handsome hardy perennial, thriving in any sandy soil. An inverted pot should be placed over the large

Iostephane—*continued.*

tuberous root during severe frosts. Propagation may be effected by division; or by seeds, sown in spring.

I. heterophylla (various-leaved). *fl.-heads* nodding; ray-florets lilac, fifteen to twenty, neuter, many-nerved, adpressedly hairy beneath, obtusely tridentate at apex; disk-florets hermaphrodite, funnel-shaped; receptacle paleaceous, conical; peduncles elongated, one-flowered, densely pilose, simple at apex. Autumn. *l.*, radical ones numerous, spreading, petiolate, oblong, acute; base acuminate; margin serrate; cauline leaves very few, lanceolate; superior ones linear-lanceolate, acuminate, entire, sessile. Stems pubescent, clammy. *h.* 1½ft. 1829. (S. B. F. G. ser. ii., 32, under name of *Echinacea heterophylla.*)

IPECACUANHA. The root of *Cephaëlis Ipecacuanha*, a Brazilian plant, the cultivation of which has been introduced into India. The roots afford the important emetic, and the only known specific for dysentery.

IPOMERIA. Now included under *Gilia.*

IPOMŒA (from *Ips*, Bindweed, and *omoios*, similar, because of the close resemblance of this genus to *Convolvulus*). Including *Batatas, Calonyction, Exogonium, Pharbitis*, and *Quamoclit.* ORD. *Convolvulaceæ.* An extensive genus (over 400 species have been described) of stove or hardy, evergreen or deciduous, twining or creeping herbs, rarely shrubs, widely distributed over all warm climates, with a few species extending into North America. Flowers purple, violet, scarlet, pink, blue, or white, rarely yellow, often showy; corolla salver-shaped, campanulate or tubular; limb spreading, entire or angular. Leaves alternate, entire, lobed, or divided. Some of the stove species of *Ipomœa* are among the prettiest of plants for covering trellises or pillars, particularly over paths, where the beautifully-coloured flowers may be seen to advantage. They are of free growth, and like plenty of root room, such as may be secured by planting in a border inside the house. If this is impracticable, large pots or boxes must be substituted. The hardier kinds succeed in the open air during summer, if forwarded a little in a warm frame, and afterwards planted out in sheltered positions. All the annual species, whether stove or half-hardy, may be readily raised from seed, which should be sown early in spring, in a warm house. A good plan is to place two or three seeds each in small pots, and afterwards transfer the plants bodily into larger sizes. They should be trained on small temporary stakes until established or finally planted out. A suitable compost consists of fibry loam, rotten manure, and leaf soil, which should be mixed together and used somewhat lumpy. Evergreen Ipomœas of perennial duration may be propagated by cuttings of short side shoots, placed in peaty soil, and in a brisk bottom heat; or by layers. The latter method is that best suited for *I. Horsfalliæ*, one of the most beautiful winter-flowering species that does not succeed well from cuttings. *I. Learii* is free-growing, and requires plenty of room; it is one of the best stove species, producing bright blue flowers throughout the autumn.

I. Aitoni (Aiton's). *fl.* pale purple; corolla campanulate; tube thickened; peduncles many-flowered, longer than the petioles. April to October. *l.* cordate, roundish, three-lobed; lobes acute. *h.* 10ft. Stove evergreen twiner. (B. R. 1794.)

I. alatipes (wing-footed). *fl.*, corolla salmon-colour, 3in. in diameter; calyx large, ovate, lin. or more long; pedicels wingless but very tortuose, frequently furnished with glands; peduncles axillary, with a very broad membranaceous wing on each side, two to four-flowered. June. *l.* 2in. to 3in. long, cordate, acuminate, with a deep obtuse sinus at the base, and very obtuse rounded lobes, glabrous. Stems and branches also glabrous. Panama, 1862. Stove. (B. M. 5330.)

I. albivenia (white-veined). *fl.* pure white, large, solitary, terminating the branchlets; inside of the tube deep purple. August and September. *l.* roundish-cordate, somewhat repand, having the veins elevated, and woolly beneath. Algoa Bay, 1824. Stove evergreen twiner. (B. R. 1116.)

I. Batatas (Batatas). This is the correct name of the plant described in this work as *Batatas edulis.*

I. bignonioides (Bignonia-like). This is the correct name of the plant described in this work as *Batatas bignonioides.*

Ipomœa—*continued.*

I. Bona-nox (Good-night).* *fl.* white; corolla undivided; tube very long; peduncles one to three-flowered. July and August. *l.* cordate, entire or angular. *h.* 10ft. Tropical America, 1773. Plant very smooth. Stove twiner. (B. M. 752.)

I. cathartica (cathartic). *fl.* purple; peduncles one to three-flowered. August and September. *l.* cordate or cordately three-lobed. *h.* 10ft. West Indies, 1839. Stove evergreen climber. (B. M. 4289, under name of *Pharbitis cathartica.*) There is a deep rose-coloured variety figured in B. R. 999, under name of *Convolvulus pudibundus.*

I. chryseides (golden-flowered). *fl.* yellow, small; peduncles stiff, two to seven-flowered. July to October. *l.* oblong-cordate, sub-hastate, entire or often angular, also three-lobed. Stem twisted. Tropical Asia, Africa, and Australia, 1817. Stove evergreen twiner. (B. R. 270.)

I. crassipes (thick-peduncled). *fl.* purple; sepals very unequal; peduncles one-flowered, bibracteate, thickened above. August. *l.* oblong-lanceolate, entire, acute. *h.* 4ft. South Africa, 1842. Greenhouse. (B. M. 4068.)

I. dasysperma (thick-seeded). *fl.* bright sulphur-yellow, with a purplish tube, rather large, numerous; peduncles one to three-flowered. August. *l.* pedate; lobes five to seven, unequal. India, 1815. Stove annual. (B. R. 86, under name of *I. tuberculata.*)

I. ficifolia (Fig-leaved). *fl.* purple; peduncles three-flowered; calyx covered with black hairs. November. *l.* three-lobed; lateral lobes rounded, middle narrower and longer. Buenos Ayres, 1840. Stove deciduous twiner. (B. R. 1841, 13.)

I. filicaulis (slender-stalked).* *fl.*, corolla white or cream-colour, with a bright purple eye in the throat, scarcely ¾in. broad; peduncle filiform, solitary, mostly bearing two flowers, with slender pedicels, the upper expanding first. July. *l.* alternate, 2in. to 3in. long, less than ½in. wide, glabrous, linear-oblong, acuminate. Stems much branched, rambling rather than climbing. Tropical regions, 1778. Greenhouse annual. (B. M. 5426.)

I. Gerrardi (Gerrard's). *fl.* pure white, with a yellow throat, very fragrant, large, numerously produced. *l.* roundish, cordate. Stems 10ft. to 15ft. long. Natal, 1867. Stove evergreen twiner. (B. M. 5651.)

I. hederacea (Ivy-like).* *fl.* light blue; calyx hairy; peduncles one or two-flowered. July to September. *l.* cordate, three-lobed; lateral lobes acuminate, intermediate acute. *h.* 10ft. Tropical regions, 1597. Half-hardy annual. SYN. *I. Nil.* (B. M. 188, under name of *Convolvulus Nil.*) A resin (called Pharbitisin), used in medicine, is obtained from the seeds of this plant.

I. h. limbata (white-edged limbed). *fl.*, corolla 2in. long; tube pale rose-purple; limb deep violet-purple, edged with white, 2½in. in diameter. North Australia, 1868. A beautiful greenhouse annual. SYN. *Pharbitis limbata* (under which name it is figured in B. M. 5720).

I. Hookerii (Hooker's). Synonymous with *I. rubro-cærulea.*

I. Horsfalliæ (Mrs. Horsfall's).* *fl.* deep rich glossy rose-colour; peduncles about as long as the petioles, bearing dichotomous cymes of flowers. Winter. *l.* quintately digitate; leaflets lanceolate, quite entire, with undulated margins. West Indies, 1833. A showy and handsome stove evergreen twiner. (B. M. 3315.)

I. Jalapa (jalap). *fl.* red, white, or light pink-purple; corolla long, tubular; tube ventricose above; peduncles two-flowered, longer than the petioles. August. *l.* membranous, cordate, acuminated, entire. South United States, 1733. A greenhouse or half-hardy, tuberous-rooted, evergreen twiner, the root of which sometimes attains a weight of 40lb. or 50lb., but is hardly purgative. The true Jalap is *I. Purga.* (B. M. 1572, under name of *Convolvulus Jalapa.*)

I. Learii (Lear's).* *fl.* intensely bright blue, numerously produced. July to October. Ceylon, 1839. A very rapid-growing and handsome stove evergreen twiner. (B. M. 3928, under name of *Pharbitis Learii.*)

I. muricata (muricated). *fl.* red; sepals muricated on the back; peduncles axillary, one-flowered. June and July. *l.* glabrous, sessile, many parted. Stems filiform, branched. *h.* 1ft. South America, 1840. Stove. (B. M. 4301.)

I. mutabilis (changeable). *fl.* blue, large, numerous, cymosely aggregate on the tops of the peduncles. May to September. *l.* cordate, entire or three-lobed, acuminated, hairy above, tomentose beneath. South America, 1812. Stove evergreen twiner. (B. R. 39.)

I. Nationis (Nation's). *fl.*, calyx ½in. long, erect, mucronate-acuminate; corolla hypocrateriform; tube cylindrical, whitish, minutely pubescent, 2in. to 2½in. long, and as many lines in diameter; limb rich orange-scarlet, spreading horizontally, 2in. in diameter, five-lobed; peduncles solitary, axillary, generally three-flowered. Summer. *l.* membranous, cordate, acuminate, entire, 3in. to 5in. long; petiole 2in. to 4in. long. Stems long, slender, branched, glabrous. Peru, 1863. Greenhouse perennial. (B. M. 5432, under name of *Quamoclit Nationis.*)

I. Nil (Nil was the name first used by the Arab physicians for this plant). A synonym of *I. hederacea.*

I. pandurata (lyre-shaped).* *fl.* white, with a purple throat, large; peduncles many-flowered. June. *l.* cordate, acuminated,

Ipomœa—*continued.*

rather downy beneath. United States, &c., 1776. Hardy perennial twiner. (B. M. 1939, under name of *Convolvulus panduratus*; B. M. 1603, under name of *C. candicans.*)

I. platensis (Plata). *fl.* violet; calyx very smooth; peduncles one-flowered, shorter than the leaves. June to September. *l.* palmate. *h.* 10ft. South America, 1817. Stove evergreen twiner. (B. R. 333.)

I. pulchella (neat). *fl.* purple; lobes of corolla emarginate, plicate; peduncles twisted, one to three-flowered. December and January. *l.* quinate; leaflets petiolate, elliptic, acuminate. *h.* 10ft. Ceylon. Stove evergreen twiner. (B. M. 4305.)

I. Purga (purge).* True Jalap Plant. *fl.* purplish-rose; corolla limb broad and flat; peduncles generally one-flowered, longer than the petioles. Autumn. *l.* sagitto-cordate, acuminate, glabrous. Xalapa, 1838. Stove evergreen twiner. SYN. *Exogonium Purga* (under which name it is figured in B. R. xxxiii. 49).

FIG. 318. IPOMŒA PURPUREA, showing Habit and detached Flowering Shoot.

I. purpurea (purple).* *fl.* dark purple; calyx hispid; peduncles many-flowered. June to September. *l.* cordate, undivided. *h.* 10ft. Tropical America, 1629. See Fig. 318. This hardy annual is the well-known and deservedly popular *Convolvulus major* of seed catalogues. SYN. *Convolvulus purpurea* (B. M. 113). *I. p. incarnata* (B. M. 1682) and *I. p. varia* (B. M. 1005) are two varieties of this species.

FIG. 319. IPOMŒA QUAMOCLIT, showing Habit and detached Flowering Branchlet.

I. Quamoclit (Quamoclit).* *fl.* dark red; solitary. July to September. *l.* pinnate; pinnæ filiform. *h.* 6ft. Tropical America, 1629. Greenhouse twining annual. See Fig. 319. (B. M. 244.)

I. rubro-cærulea (reddish-blue).* *fl.* white in the bud, with the limb of a rich lake-red, which, when the flower is fully expanded, becomes of a fine purplish-blue; peduncles three or four-flowered, thickened, somewhat racemose. November, December. *l.* on long petioles, deeply cordate, acuminate. South Mexico, 1830. Stove evergreen twiner. SYN. *I. Hookerii.* See Fig. 320. (B. M. 3297.)

I. setosa (bristly). *fl.* purplish-red, salver-shaped; peduncles robust, many-flowered, trichotomously cymose. August to October. *l.* naked, cordate, three-lobed; lobes dentately sinuated. Branches, petioles, and peduncles hispid from bristles. Brazil. Stove deciduous twiner. (B. R. 335.)

Ipomœa—*continued.*

FIG. 320. IPOMŒA RUBRO-CÆRULEA, showing Habit and detached Flowering Shoot.

I. sinuata (sinuated). *fl.* white, with a reddish throat; peduncles one-flowered, longer than the leaves. June to September. *l.* deeply seven-parted; segments sinuated or pinnatifid. Stem, petioles, and peduncles very pilose. Tropical America, 1813. Greenhouse evergreen twiner. See Fig. 321.

FIG. 321. LEAF OF IPOMŒA SINUATA.

I. Tweediei (Tweedie's). *fl.* purple; corolla with elongated tube; sepals ovate, acute, unequal; peduncles one or two-flowered. June and July. *l.* cordate, acute, entire. *h.* 6ft. Panama, 1838. Stove evergreen twiner. (B. M. 3978.)

I. tyrianthina (tyrianthine). *fl.* dark purple; calyx villous; peduncles many-flowered. August to November. *l.* roundish-cordate, acuminate, villous. Stems fruticose, warted. *h.* 10ft. Mexico, 1838. Greenhouse deciduous twiner. SYN. *Pharbitis tyrianthina* (under which name it is figured in B. M. 4024).

I. versicolor (various-coloured). *fl.* bright rosy-crimson at first, changing as they expand, first to orange and then to pale yellow, disposed in scorpioidal racemes; corolla limb salver-shaped, with a swollen tube. June. *l.* cordate at the base, three-lobed. South Mexico, 1841. (B. R. 1842, 24, under name of *Mina lobata.*)

IPOMOPSIS. This genus is now included under **Gilia** (which *see*).

IPSEA. Now included under **Pachystoma** (which *see*).

IRESINE (from *eiros*, wool; referring to the woolly aspect of the branches). ORD. *Amarantaceæ.* A genus of about eighteen species of erect herbs or sub-shrubs, natives of tropical and sub-tropical America. Flowers white or greenish, inconspicuous, with three bracts. Leaves opposite, petiolate, very ornamental in the cultivated sorts. Iresines are indispensable plants in all bedding-out arrangements, on account of their beautifully-coloured foliage. They are easily propagated in spring for this purpose, by inserting in a close pit or propagating frame. The best plan for securing and preserving healthy stock plants is, to insert a quantity of cuttings

Iresine—*continued.*

in 5in. pots in August, and place them in any close frame. They soon root, and the plants thus obtained should be kept rather dry throughout the winter, and in a temperature of about 55deg. An increase of heat and moisture, about March, will cause the production of strong cuttings. Iresines are rather tender; consequently, they should not be planted out before the beginning of June, except in warm localities where there is no danger from late spring frosts. A warm season is best for bringing the foliage to perfection, particularly that of *I. Herbstii*. *I. Lindenii* is one of the most distinct sorts, and an invaluable bedding plant.

Greenfly and Red Spider are troublesome insects, especially in winter and spring, when the plants are indoors. The former may be destroyed by fumigation; and frequent syringings will greatly tend to prevent Red Spider from becoming established.

I. Herbstii (Herbst's).* *l.* opposite, somewhat cordate, deeply two-lobed at the apex, and concave; upper surface dark maroon; midrib and primary veins broadly margined with carmine; under side deep crimson. Stem and branches bright carmine, almost transparent. *h.* 12in. to 18in. South Brazil, 1864. SYN. *Achyranthes Verschaffeltii*. (B. M. 5499.)

I. H. acuminata (acuminated). A handsome form, with sharply acuminated leaves. (F. M. 441.)

FIG. 322. IRESINE HERBSTII AUREO-RETICULATA, showing Habit and detached Portion of Inflorescence with Leaf.

I. H. aureo-reticulata (golden-netted).* This variety has deep vinous-red stems, leafstalks, and principal veins; the surface of the leaves being green, blotched with gold. See Fig. 322. (F. M. 333.)

I. Lindenii (Linden's).* *l.* narrow, oblong-lanceolate, rich deep blood-red, with a central band of amaranth. Ecuador, 1868. A very handsome and compact-growing plant.

IRIARTEA (named in honour of Juan Iriarte, a Spanish botanist). SYN. *Deckeria*. ORD. *Palmeæ*. This genus contains about five species of stove palms, rarely seen in cultivation, and rather difficult to grow. According to Mr. Williams, Iriarteas should be potted in a compost of nearly all sand and loam, and plunged in a tank of water, without which they are not likely to succeed. Propagated by imported seeds.

I. deltoidea (deltoid).* *l.* pinnate; pinnæ about 2in. broad, sessile, erose at the apex; apical segments much the largest, 6in. to 12in. long, and nearly as much in breadth. Plant spineless. Peru. An elegant species. SYN. *I. robusta*.

I. exorhiza. *See* **Socratea exorhiza.**

I. præmorsa (bitten off). *See* **Catoblastus præmorsus.**

I. robusta (robust). A synonym of *I. deltoidea*.

IRIDEÆ. A natural order of monocotyledonous plants. Perennial herbs. Flowers regular or irregular, terminal, in a spike, corymb, or loose panicle, rarely solitary, each furnished with two (rarely more) spathaceous bracts, usually scarious; perianth superior, petaloid, tubular, six-fid, regular or sub-bilabiate; stamens three, inserted at the base of the outer row of the perianth; anthers innate,

Irideæ—*continued.*

opening on the back. Leaves usually all radical, equitant, distichous, ensiform or linear, angular, entire, flat, or folded longitudinally, the cauline ones alternate, sheathing. Irideæ inhabit both warm and temperate regions, and abound at the Cape of Good Hope. They possess fragrant, stimulant, and acrid properties. Illustrative genera are: *Crocus*, *Gladiolus*, *Iris*, *Ixia*.

IRIS (the Greek name for the rainbow, used as a title of this plant since the time of Hippocrates). Including *Evansia*, *Gynandriris*, *Hermodactylon*, *Oncocyclus*, *Xiphion*, &c. ORD. *Irideæ*. A genus of about a hundred species of mostly hardy herbaceous plants with creeping or tuberous rootstocks, natives of Northern temperate regions. Flowers in sheaths; perianth six-cleft; segments in two rows; three outer ones reflexed, often bearded at the base; three inner ones erect, usually smaller than the others; perianth tube short; stamens three, inserted at the base of the outer row of the perianth; anthers innate; style with three petal-like divisions. Capsule leathery, trigonous, dehiscing loculicidally. Leaves chiefly radical, equitant, sword-shaped or linear.

The numerous species and varieties of *Iris*, now in cultivation, comprise a large and most interesting group of hardy plants, remarkable alike for their curiously-constructed and quaintly-marked flowers, and for the peculiar manner in which many beautiful colours are blended in them. A large proportion of the commoner species do not need more than ordinary attention to secure a profusion of flowers annually; but there are several which require special treatment, and can then rarely be induced to flower. These are, however, well deserving of special attention, on account of the beautiful markings and combination of colours the limited number of flowers they bear more particularly exhibit. There are two large and distinct sections into which the Iris is usually divided according to its habit of growth, and these are distinguished by the one having long bulb-like corms, and the other creeping fleshy root-stocks or rhizomes. For convenience, they may be termed the bulbous and rhizomatous sections, and a reference made to each separately, as the proper treatment varies somewhat considerably with several of the species. The flowering season of the Iris is principally spring and early summer; but, with an assortment of the numerous species and varieties in each section, it may be prolonged throughout almost the whole year. Height in the plants varies from 2in. or 3in. in some species, to 3ft. or 4ft. in others; and a great diversity of habit is also represented.

Propagation. The plants belonging to the bulbous section of *Iris* may be raised in quantities from seed if desired. It is produced by many in both sections, if allowed, and should be sown in sandy soil, so soon as ripe, preferably in pans or boxes, which may be placed

FIG. 323. DEHISCING CAPSULE OF IRIS.

in a cold frame. Fig. 323 shows the way in which the seed capsule bursts, when ripe, for discharging its con-

Iris—*continued.*

tents. The seeds germinate the following spring, and bulbs, sufficiently large for flowering, may be expected after three years' growth. Quantities of offsets may also be utilised for propagating purposes; but care should be taken not to injure the old bulb in removing them, or allow it to be kept too long exposed to the air. The rhizomatous section may be propagated by division; or by layering, if roots are not readily emitted in the ordinary way.

Cultivation. The bulbous section, or Xiphions, are principally represented in gardens by what are known as English and Spanish Iris. Both are of Spanish origin, and vary chiefly in the size of the bulbs and flowers, and in the more curious combination of colours, as exhibited in the flowers of the former. *I. filifolia*, *I. Histrio*, *I. persica*, and *I. reticulata*, are very beautiful, and early flowering species, also of this section. They all succeed best in a light, rich, sandy soil, and in a situation fully exposed to sun, yet protected, if possible, from easterly or other strong winds. Efficient drainage in autumn and winter are important conditions, and the bulbs should not be removed from the soil more than is really necessary. Bulbous Iris are most attractive when planted in masses.

Of the rhizomatous species there are large numbers, which may be grouped according as their cultivation requires. The bearded, more commonly called the German Irises, comprise a number of varieties, having large and very handsome flowers; and, as they are among the easiest to cultivate, they are largely grown. Their rhizomes (see

FIG. 324. SURFACE RHIZOMES OF GERMAN IRIS.

Fig. 324) are formed on the top of the ground, and should not be covered with soil, or they will be liable to rot in winter. Dwarf-growing species, like *alata*, *aphylla*, *biflora*, *Chamæiris* and its varieties, *pumila* with its varieties, and *rubro-marginata*, should be provided with a sunny position on a rockery, and be planted in light, rich soil. *flavescens*, *florentina*, *germanica*, *lutescens*, *sambucina*, and *squalens*, are a few of the stronger-growing bearded Iris, that are not so particular regarding the soil or situation wherein they are planted.

The beardless Irises comprise a large group, and their cultivation varies considerably with different species. Some do best in heavy loam, others in peat and loam, and others again in nearly all peat, formed into a sort of semi-bog, by the insertion of 3in. of clay beneath it. Some of the species which succeed with this latter preparation are: *fulva*, *hexagona*, *lævigata*, *pseudacorus*, *setosa*, *sibirica* and its varieties, and *versicolor virginica*. Examples of beardless Iris which succeed in loam, or loam and peat, are: *aurea*, *graminea*, *Guldenstädtiana*, *humilis*, *Monnieri*, *ochroleuca*, and *spuria*.

I. iberica and *I. susiana* are two of the most singular and beautiful species, belonging to a separate group or

Iris—*continued.*

sub-genus. They are amongst the most difficult of plants to flower, and require special treatment, apart from any of the others. A frame, and light, rich soil, should be provided for their accommodation, and they should be dried off, and allowed the fullest exposure to the sun from the time flowering is over, until spring of the following year. Plenty of river sand round the rhizomes tends to keep them dry in winter—an important point in the cultivation—and also assists in effecting perfect drainage at all times. All varieties of *Iris* are impatient of root disturbance, their flowering being much hindered thereby. Plants that are established increase in size rapidly, and flower with much more certainty if allowed to remain undisturbed. They like plenty of sun and air, but should be protected, if practicable, from east and northerly winds.

In the subjoined list, the Synopsis of Mr. J. G. Baker, which appeared in the columns of the *Gardeners' Chronicle*, has been followed.

Sect. I. Irises proper.

I. amœna (pleasing). A synonym of *I. hybrida*.

I. aphylla (leafless). *fl.* scentless; limb dark lilac, 2½in. deep; falls obovate, ¾in. to ¼in. broad, reflexing half-way down, cuneately narrowed to a long claw; beard white; standards erect, a little broader than the falls, suddenly narrowed into a long claw; claws white, veined with lilac. May. *l.* not more than two produced to a tuft, glaucous-green, ensiform, falcate. Stems forked low down, or two or even three produced from the same tuft. *h.* 1ft. Eastern Europe and Western Asia. (B. M. 2351; B. R. 801, under name of *I. furcata*.)

I. arenaria (sand-loving). *fl.* bright yellow, striped with purplish-brown on the claws; falls oblong-spathulate, with a bright yellow beard reaching half-way up; standards rather shorter, and narrow; scape slender, erect, one or two-flowered. May. *l.* tufted, few, linear. Rhizome much-branched. *h.* 3in. to 4in. Hungary to European Russia, 1802. This plant is well adapted for rockery or pot culture, but is not common in English gardens. (B. R. 549.)

I. aurea (golden).* *fl.* bright yellow; falls oblong, crisped at the edge; standards oblanceolate, shorter than the falls. June. *l.* ensiform, about 2ft. long. Stem stout, bearing two sessile clusters of flowers. *h.* 3ft. to 4ft. Western Himalayas. (B. R. xxxiii. 59.)

I. balkana (Balkan).* *fl.* bright lilac-purple; tube 1½in. long; limb 3in. long; falls 1½in., and standards 1½in. broad; spathe valves green, acute. April. Stem as long as the leaves. *h.* 1ft. Northern Thrace, 1878. Mr. Baker regards this as a variety of *I. Chamæiris*; it is a very fine plant.

I. biflora (two-flowered).* *fl.* bright violet-purple; limb 2in. to 2½in. deep; falls obovate, 1in. broad, reflexing half-way down, the yellow beard over 1in. long; standards erect, over 1in. broad; spathe two-flowered. April. *l.* ensiform, rather glaucous. Rhizome stout, short-creeping. South Europe, 1596. SYNS. *I. fragrans*, *I. nudicaulis* (under which name it is figured in B. M. 5806), *I. subbiflora*.

I. biglumis (two-plumed). A synonym of *I. ensata*.

I. Bloudovii (Bloudow's). *fl.* light yellow; limb almost 2in. long; outer segments obovate-cuneate, nearly or quite 1in. broad, reflexing half-way down, the bright yellow beard running more than half-way up; standards erect, as broad as the falls, but somewhat shorter; spathe two-flowered. May. *l.* linear, thin. *h.* 6in. to 12in. Altai Mountains. (R. G. 1020.)

I. brachycuspis (short-pointed). A synonym of *I. setosa*.

I. Chamæiris (dwarf Iris).* *fl.* solitary; limb 2in. deep; falls oblong-spathulate, ¾in. broad, bright yellow, tinged and veined with brown; beard bright orange-yellow; standards erect or converging, oblong-unguiculate, 1in. broad, crisped at the edge, primrose-yellow. April. *l.* four to six in a tuft, ¾in. to ½in. broad, pale green. *h.* 4in. to 6in. South Europe.

I. C. olbiensis (Olban). *fl.*, limb deep lilac-purple, 2in. long; falls 1in. broad; claw white, veined with purple; beard white, tipped with yellow; standards obovate-unguiculate, a little broader than the falls. April. Stem 4in. to 6in. long, clasped by a sheathing leaf a little above the base. South of France. (B. M. 6110.)

I. chinensis (Chinese). A synonym of *I. japonica*.

I. cretensis (Cretan).* *fl.*, limb lilac, 2in. deep; falls obovate-unguiculate, beardless, ¾in. broad; the reflexing lamina much shorter than the narrow claw; standards oblanceolate-unguiculate, ½in. broad. April and May. *l.* in dense tufts, narrow-linear, erect, firm, and stout in texture, acuminate, closely and distinctly ribbed. Stem none, so that the spathe is sessile in the centre of the cluster of leaves. Greece, Asia Minor, Crete, and the Ionian Islands. (B. M. 6343.)

I. cristata (crested).* *fl.*, limb pale lilac, about ½in. deep; falls with an obovate-obtuse reflexing blade, ½in. broad, the throat and

Iris—*continued.*

crest deep yellow; standards erect, oblanceolate, less than ½in. broad, and rather shorter than the falls. April and May. *l.* about four, in a distichous rosette, linear, broad at the middle. Stem very short, two-flowered. *h.* 6in. Eastern United States, 1756. (B. M. 412; L. B. C. 1366.)

I. dichotoma (two-forked). *fl.*, limb lilac, about 1lin. deep, not opening till afternoon, and only expanding once, twisted spirally after flowering; falls oblong, ½in. broad, the claws obscurely bearded, white, spotted with purple; standards oblanceolate, deeply emarginate; clusters five or six-flowered. July. *l.* in an erect, distichous cluster, ensiform. Stem 2ft. to 3ft. high, slender, corymbosely branched. Davuria and North China, 1784. A very distinct species. (B. R. 246; S. B. F. G. 96.)

I. Douglasiana (Douglas').* *fl.*, limb bright lilac-purple, 1½in. to 2in. deep; falls obovate-spathulate, with a reflexing lamina ½in. to ¾in. broad, as long as the claw; standards rather shorter, oblanceolate-unguiculate, erect. June. *l.* about four in a tuft, linear, thick, rigid, strongly ribbed. Stems 6in. to 12in. high, slender, having one or two clusters of flowers. California, 1873. (B. M. 6083.)

I. ensata (sword-shape-leaved). *fl.*, limb lilac-purple, about 2in. deep; divisions all oblanceolate; falls with a reflexing blade, marked with yellow, and veined at the throat; standards erect, lilac, ½in. broad; cluster single, terminal, one to three-flowered. June and July. *l.* tufted, linear, glaucous, firm. Stem firm, about 1ft. high. Temperate Asia. A rare but handsome species. SYNS. *I. biglumis*, *I. fragrans* (B. R. xxvi. 1), *I. lungispatha* (B. M. 2528), *I. Pallasii* (B. M. 2331).

FIG. 325. IRIS GERMANICA, showing Habit and detached Flower.

I. flavescens (yellowish).* *fl.* lemon-yellow; limb about 2in. deep; falls obovate-cuneate, about 1½in. broad, reflexing half-way down; claw veined with purplish-brown; beard orange-yellow; standards erect, obovate, rather shorter and broader than the falls; clusters terminal, three or four-flowered. May. *l.* few, tufted, ensiform, 1ft. to 1½ft. long. Stem 2ft. to 3ft. high, glaucous, branched about half-way down. Eastern Europe and Western Asia, 1818. (S. B. F. G. ser. ii. 56; B. R. 1845, 35, under name of *I. imbricata*.)

I. florentina (Florentine).* *fl.* fragrant; limb 3in. to 3½in. deep; both rows of segments eighteen to twenty-one lines broad; falls obovate-cuneate, white, tinged with lavender, reflexing half-way down; claw veined with green and brown; beard bright yellow; standards erect, obovate-oblong, with a short claw, pure white. May. *l.* few, tufted, ensiform, glaucous. Stems 2ft. to 3ft. high, branched above the middle, bearing three or four terminal spathes. South Europe, 1596. The rhizome of this possesses cathartic and emetic properties; it is also used as the basis of many perfumery powders. (B. M. 671; B. M. Pl. 275.)

I. fœtidissima (very fœtid).* Stinking Gladwin. *fl.*, limb bluish-lilac, 2in. deep; falls obovate-unguiculate, the oblong-obtuse lamina ¾in. broad; standards erect, oblanceolate, three to four lines broad, shorter than the falls; clusters sessile, lateral. June. *l.* ensiform, same length as stem, firm. Stem compressed, 2ft. to 3ft. high. West Europe (Britain). A very desirable species, of easy cultivation in almost any situation, but it prefers and flourishes best in a moist one. Its large, thrice-divided seed pods, showing the large, orange-coloured seeds, are very ornamental. (Sy. En. B. 1494.)

Iris—*continued.*

I. fragrans (fragrant), of Lindley. A synonym of *I. ensata*.

I. fragrans (fragrant), of Salisbury. A synonym of *I. biflora*.

I. fulva (tawny).* *fl.*, limb bright fulvous-brown, 2in. to 2½in. deep; all the segments reflexing equally when expanded; falls oblong-unguiculate, ¾in. to 1in. broad, obtusely rounded at the top, deeply emarginate, gradually narrowed into a claw not more than ½in. long, velvety on the face, with reddish-brown pubescence on the keel; standards shorter, oblanceolate-spathulate, 1½in. long, ½in. to ¾in. broad. June. *l.* narrow-ensiform, bright green. Stems 2ft. to 3ft. high, forked low down, angular in the lower part, furnished at the forks with large leaves. United States. (B. M. 1496.)

I. germanica (German).* German or common Iris. *fl.* fragrant; limb 2½in. to 3in. deep; falls obovate-cuneate, 1½in. to 2in. broad, bright purple, reflexing half-way down; claw white with brownish veins; beard bright yellow; standards obovate-unguiculate, deep lilac, erect; clusters four or five-flowered. May. *l.* tufted, few, ensiform, very glaucous. Stem 2ft. to 3ft. high, glaucous, forked half-way down. Central and South Europe. A fine ornamental species, and one of the commonest in cultivation; it has numerous very elegant varieties. See Fig. 325. (B. M. 670; B. R. 818, under name of *I. nepalensis*).

I. gigantea (gigantic). A garden name of *I. ochroleuca*.

I. graminea (grass-leaved).* *fl.* slightly fragrant; limb bright lilac-purple, 1½in. to 2in. deep; falls with an orbicular limb, ½in. broad; claw dull yellow; throat veined with blue-purple on a white ground; standards erect, purple, ¾in. broad; clusters terminal, two or three-flowered. May. *l.* about four, tufted, linear, much overtopping the flowers. Stem solid, ancipitous, about 9in. high. Central and Southern Europe, 1597. (B. M. 681.)

FIG. 326. IRIS GULDENSTÄDTIANA.

I. Guldenstädtiana (Guldenstädt's).* *fl.*, limb 2in. deep; claws of the falls much longer than the obovate deflexed lamina, which is pure white, ¾in. broad, with an orange throat; standards oblanceolate, ½-in. broad, erect, rather shorter than the falls, pure white, with a yellow keel and border; spathes two or three-flowered. June. *l.* firm, ensiform. Stems stout, 2ft. high. Siberia, 1757. This species is, according to Mr. Baker, the *erratica* and *Wittmaniana* of many gardens. SYNS. *I. halophila* (of Pallas, but not of B. M. 875, which is *I. spuria notha*), *I. stenogyne*. See Fig. 326.

I. halophila (salt-loving). A synonym of *I. Guldenstädtiana*.

I. hexagona (hexagonal). *fl.*, tube funnel-shaped, ¾in. to 1in. long, pale or deep lilac, 3in. to 3½in. deep; falls obovate-unguiculate, the lamina exceeding the claw, 1in. to 1½in. broad; standards erect, oblanceolate-spathulate, ½in. broad, rather shorter than the falls; spathe valves often 5in. to 6in. long April. *l.*, basal ones ensiform, 2ft. to 3ft. long, by 1in. to 1½in. broad. Stems 3ft. to 4ft. high, deeply forked, and furnished with several large leaves. Southern United States. (B. M. 6787.)

Iris—*continued.*

I. humilis (low). *fl.*, limb bright lilac, 1¼in. to 2in. deep; falls oblong-spathulate, beardless; claw exceeding the blade; standards rather shorter, oblanceolate-unguiculate, erect; spathe sessile in the centre of the cluster of leaves, one-flowered. *l.* about a dozen, in a basal rosette, linear, glaucous, ribbed. Stem none. Southern Russia, Siberia, &c.

I. hybrida (hybrid).* *fl.*, limb 2in. to 2½in. deep; falls obovate-cuneate, 1¼in. to 1½in. broad, reflexing half-way down, plain, deep lilac-purple at the tip, copiously veined lower down with the same colour on a pure white ground; beard yellow; standards the same breadth, erect, obovate-unguiculate, pure white, or slightly tinged with lilac. June. *l.* about 1ft. long, 1in. to 1¼in. broad, purple at the base. Stem forked low down, with three or four terminal spathes. A handsome garden race of unknown origin—according to Mr. Baker, probably derived from *I. squalens*. SYN. *I. amœna*. There are a number of desirable varieties.

FIG. 327. FLOWER OF IRIS IBERICA.

I. iberica (Iberian).* *fl.* solitary; limb 3in. deep; segments nearly equal, ovate, obtuse, cuneately narrowed to a short claw, 1½in. to 2in. broad; falls reflexing from near the base, closely veined like those of *I. susiana* with dark purplish-brown, with a velvety, plain, dark purple blotch at the throat; standards erect, veinless, white or pale lilac. Summer. *l.* few, in a basal tuft, falcate, glaucous, linear. Stem 3in. to 6in. high. Caucasus. See Fig. 327. (R. G. 386, 1, 2.)

I. i. insignis (remarkable).* A very striking and handsome variety, with larger flowers, and a dwarfer habit than the typical species; falls white, veined with black lines, densely spotted and blotched with reddish-brown; standards lilac-white, veined and thickly spotted throughout with a deeper tint of the same hue. This variety should be planted in the hottest and driest part of the garden, and be fully exposed to the sun.

I. japonica (Japanese). *fl.*, limb lilac, 1in. to 1½in. deep, division spreading falcately; falls oblong-spathulate, ½in. broad, crisped, and irregularly fimbriated at the edge, spotted with yellow and white at the centre, and furnished with a fimbriated petaloid crest reaching two-thirds of the way up; standards plain lilac, rather narrowed. April and May. *l.* in a fan-like tuft, ensiform, bright green. Stem 1ft. to 1½ft. high, of which the upper half or two-thirds is occupied by a lax panicle with erecto-patent branches. Japan and China. SYN. *I. chinensis* (under which name it is figured in B. M. 373, 1797).

I. Kæmpferi (Kæmpfer's). A synonym of *I. lævigata*.

I. Korolkowi (Korolkow's). *fl.*, limb 2½in. deep, groundwork white tinged with brown, marked with copious dark brown veins, radiating from the throat; blade of the falls oblong, 1⅓in. long, 1in. broad; claw bearded; standards rather broader, oblong-unguiculate, erect. *l.* linear, glaucous, as long as the stem. Stem 1ft. to 1½ft. high, leafy in the lower part, ending in a solitary, two-flowered, terminal spathe. Turkestan, 1874. (R. G. 766.)

I. lævigata (smooth).* Japanese Iris. *fl.* solitary; limb deep bright purple, 3in. to 3½in. long; falls obovate-unguiculate, reflexing from low down, with a bright yellow blotch at the throat; standards oblanceolate-spathulate, purple, 2in. long, ½in. broad. June. *l.* narrow-ensiform, pale green, thin, weak. Stem 1½ft. to 2ft. high firm, solid, glaucous. Siberia and Japan. A handsome species, and one of the best of the genus. SYN. *I. Kæmpferi*, under which name it is most generally known. This is cultivated by the Japanese as a sub-aquatic, and in England it thrives best when copiously supplied with water during the growing season. It succeeds admirably when cultivated in pans,

Iris—*continued.*

and the bottoms of these placed a depth of a couple of inches in a tank of water. (R. G. 442, 1; B. M. 6132.) There are a great number of exceedingly beautiful varieties of this species in cultivation, many of which produce flowers measuring quite 10in. across. There are also several desirable double forms, one of which, *flore-pleno*, is illustrated at Fig. 328.

FIG. 328. IRIS LÆVIGATA FLORE-PLENO.

I. longipetala (long-petaled). *fl.* in a single terminal head; limb bright lilac, 2½in. to 3in. deep; falls obovate, unguiculate, reflexing half-way down; lamina obovate, 1in. to 1¼in. broad, cuneately narrowed into the short claw, which has a bright yellow keel and violet veins on a pure white ground; standards erect, oblanceolate-spathulate, 2in. long, ½in. broad. Summer. *l.* firm, narrow-ensiform, 1ft. to 1½ft. long. Stems 2ft. to 3ft. high, solid, compressed. California, 1862. (B. M. 5298.)

I. longispatha (long-spathed). A synonym of *I. ensata*.

I. lurida (dingy). *fl.*, limb 2½in. deep; falls oblong, 1in. broad, reflexing half-way down, cuneately narrowed to the base, having the upper part plain dead purple, and the lower half veined with dead purple on a yellow groundwork; beard bright yellow; standards rather broader, with a crisped, veinless, dull purple blade and veined yellow claw; spathes one or two-flowered. April. *l.* ensiform, slightly glaucous. Stems deeply forked, about 2ft. high. Eastern Europe, 1758. Closely allied to *I. variegata*, but inferior as a decorative plant. (B. M. 986.)

I. lutescens (yellowish).* *fl.* 2½in. deep; falls pale yellow, tinged and veined with purplish-brown, oblong, nearly or quite 1in. broad, with a reflexing blade as long as the claw; beard bright yellow; standards broader, erect, primrose-yellow, narrowed suddenly to the claw. May. *l.* ensiform, slightly glaucous. Stem terete, glaucous, unbranched. South Europe. (B. M. 2861.)

I. missouriensis (Missouri). *fl.*, perianth tube funnel-shaped, ¼in. to ⅓in. long; outer segments of limb 2in. to 2½in. long, veined with lilac-purple on pale groundwork, and faintly keeled with yellow towards base of limb; inner segments nearly as long as the outer, plain lilac-purple. May. *l.*, produced ones about four to a tuft, linear, not more than 1ft. long, ⅓in. to ½in. broad, narrowed gradually to the point, firm in texture. Stem bearing a single cluster of two or three flowers. Rocky Mountains, 1880. (B. M. 6579.)

I. Monnieri (Monnier's).* *fl.* fragrant, clustered; limb bright lemon-yellow, 3in. to 3½in. deep; falls roundish, eighteen to

Iris—*continued.*

twenty lines broad, equalling the claw; standards spreading, oblanceolate-spathulate, 3in. long, 1in. broad; spathes two-flowered. June and July. *l.* firm, sub-erect, lanceolate, about 2ft. long. Stems stout, terete, 3ft. to 4ft. high. Crete.

I. neglecta (neglected).* *fl.*, limb 2in. deep; falls bright lilac, obovate-cuneate, 1in. to 1¼in. broad, much striped on a pure white ground; beard bright yellow; standards obovate-unguiculate, 1¼in. broad, bright light unstriped lilac. June. *l.* ensiform, slightly glaucous, purple at the base, 1ft. to 1½ft. long. Stem 1½ft. to 2ft. high, branched above the middle. A very common form, the native country of which is unknown. It is the handsomest species of the *germanica* group. (B. M. 2435.) About a score named varieties are catalogued by some growers.

I. nepalensis (Nepaul). *fl.*, limb lilac, 1½in. to 2in. deep; falls with a reflexing oblong blade as long as the claw, furnished with a yellow crest down the lower two-thirds of the keel; standards oblanceolate, unguiculate, erect, rather shorter than the falls. *l.* linear, moderately firm in texture, with several strong ribs, and narrowed gradually to an acuminate point. Stem 6in. to 1ft., with one to three clusters of flowers. Himalayas, 1828. (S. B. F. G. ser. ii. 11.) The plant figured in B. R. 818 is not *I. nepalensis*, but *I. germanica*.

I. nudicaulis (naked-stemmed) A synonym of *I. biflora*.

I. ochroleuca (yellowish-white).* *fl.* clustered; limb 3in. to 3½in. deep, the round-obovate, suddenly-reflexed blade eighteen to twenty-one lines broad, pure white at the edge, bright orange-yellow at the base, as long as the claw, which is yellow on the face, without veins, and green on the back; standards erect, oblanceolate, rather shorter than the falls. June. *l.* firm, ensiform, 1in. broad. Stem 3ft. high, stout, terete. Native country uncertain. (B. M. 61; R. H. 1875, 357, under name of *I. gigantea*.)

I. orientalis (Eastern). This species closely resembles *I. sibirica*, but differs from it by the redness of its young leaves, shorter peduncles, more tender leaves and spathe valves, and more fugitive flowers. Japan and the East of Siberia. (B. M. 1604, under name of *I. sibirica sanguinea*.)

I. Pallasii (Pallas'). A synonym of *I. ensata*.

FIG. 329. FLOWER SCAPE OF IRIS PALLIDA.

I. pallida (pale). *fl.* with an Orange-blossom-like fragrance; limb 2in. to 2½in. deep, varying from a bright slaty-lilac to a deep lilac-purple; falls 1½in. to 2in. broad, reflexing half-way down, veined in the lower half with bright lilac on a white ground; beard bright yellow; standards as broad as the falls, somewhat crisped, obovate. June. *l.* few, tufted, ensiform, 12in. to 18in. long. Stems 2ft. to 3ft. high. Mediterranean region, 1596. A fine species, with many very desirable varieties. See Fig. 329. (B. M. 685.)

Iris—*continued.*

I. plicata (plicate). *fl.* fragrant; limb 2½in. deep; falls 1½in. broad, obovate, cuneately narrowed from the middle to the base, pure white in the centre, veined with bright lilac round the edge and on the claw; beard tipped with yellow; standards 1½in. broad, obovate-oblong, very plicate, pure white in the centre, lilac round the border. July. *l.* slightly glaucous, 12in. to 18in. long, 1in. to 1½in. broad. Stem 2ft. to 3ft. high, sub-terete, bearing four to six clusters of flowers. A garden race, of unknown origin. (B. M. 870, under name of *I. aphylla plicata*.)

I. prismatica (prismatic). *fl.* often in twos; limb 1½in. to 2in. deep, bright lilac-blue; falls with a roundish limb, under 1in. broad, much shorter than the strap-shaped claw; standard oblanceolate-unguiculate, erect, much shorter than the falls. May. *l.* linear, tufted, moderately firm. Stem 1½ft. to 2ft. high, slender, terete. Eastern United States. This species is very like *I. sibirica*, but it has exserted pedicels, and a small spathe. (B. M. 1504.)

I. Pseudo-acorus (bastard Acorus).* Yellow Iris, or Water Flag. *fl.* large, almost scentless, clustered; limb bright yellow, 2in. to 2½in. deep; falls rotundate, 1½in. to 1½in. broad, bright orange-yellow, with a deeper spot at the throat, with radiating veins of brown; claw green down the back; standards oblanceolate, spathulate, erect, about ½in. long. April. *l.* ensiform, glaucous, 1in. broad. Stem 2ft. to 3ft. high, stout, terete, forked low down. Europe (Britain), Western Asia. A well-known and handsome bog-plant, of which there is a variety among two or three others, with variegated leaves. (F. D. 494; Sy. En. B. 1495.)

FIG. 330. IRIS PUMILA.

I. pumila (dwarf).* *fl.* small, solitary; limb bright lilac-purple, 2in. deep; falls oblong-unguiculate, ¾in. broad, reflexing about half-way down, with a dense white beard down the claw and lower part of the keel; standards erect, same length and breadth as the falls, not quite so deep in colour. April. *l.* ensiform, about four in a tuft, slightly glaucous. Stem scarcely any. *h.* 4in. or 5in. Europe, Asia Minor, 1596. An exceedingly pretty species, the type and its varieties, making excellent subjects for edging or for bedding purposes. See Fig. 330. (B. M. 9.)

I. p. attica (Attic). *fl.* yellow; divisions feather-veined with brown-lilac.

I. p. cærulea (blue). *fl.*, limb bright blue; beard of the falls bright yellow. (B. M. 1261.)

I. rubro-marginata (red-margined).* *fl.*, tube 2in. long, green, tinged with purple towards the top; limb dead purple, 2in. to 2½in. deep; falls obovate-unguiculate, reflexing half-way down, with a purple beard; standards obovate-unguiculate, erect; spathe two-flowered, the valves keeled and margined with red. Spring. *l.* falcate-ensiform, 2in. to 3in. long, ½in. broad. Stem none. *h.* 4in. Scutari, 1875.

I. ruthenica (Russian). *fl.* fragrant; limb lilac-purple, 1½in. deep; falls oblong-unguiculate, with a reflexed lamina ¾in. broad; standards oblanceolate-unguiculate, erect, ¾in. broad. Spring. *l.* much overtopping the flowers, linear, acuminate, firm, ribbed. Stems slender, 1in. to 4in. high, one-headed. Transylvania and Siberia to China, 1804. (B. M. 1123 and 1393.)

I. sambucina (Elder-scented).* *fl.* with a strong scent of Elder, large, disposed in clusters; limb 2in. to 2½in. deep; falls obovate-cuneate, reflexing half-way down, little over 1in. broad, upper half plain claret-purple; beard yellow; standards obovate-unguiculate, erect, emarginate, 1½in. broad, dull yellow, suffused with dull claret-purple. May. *l.* about six in a tuft, glaucous, 15in. to 18in. long, 1in. to 1½in. broad. Stems 2ft. high, branched low down, bearing three or four clusters of flowers. Europe, Asia Minor, 1758. (B. M. 187.)

I. setosa (bristle-pointed). *fl.* clustered; limb bright lilac, 2in. to 2½in. deep; falls obovate-unguiculate, 1in. broad, reflexing half-

Iris—*continued.*

way down; standards oblanceolate-spathulate, erect, ¼in. long. May. *l.* thin, basal ones 1ft. or more long, about ½in. broad. Stems 2ft. to 3ft. high, rather stout, branched low down. Eastern Siberia to Japan, 1844. A rare and handsome species, not unlike *I. sibirica*. SYN. *I. brachycuspis* (under which name it is figured in B. M. 2326).

I. sibirica (Siberian).* *fl.* two or three in a cluster; limb bright lilac-blue, 1½in. to 2in. deep; falls with an oblong blade, ⅜in. to 1in. broad, much veined with bright violet on a light ground; standards rather shorter than the falls, erect, oblanceolate-unguiculate, about ½in. broad. May and June. *l.* linear, five to six in a tuft, greenish, ribbed, 1ft. to 2ft. long. Stem terete, fistulose, 1ft. to 2½ft. high, simple or forked. Central and Southern Europe to Siberia, 1596. A well-known species, and one of the commonest in cultivation. It requires plenty of sunshine and a rich damp soil to bring its beauty to full perfection. The forms of it are numerous, and varied in colouring. The variety with double flowers is not a handsome plant. (B. M. 60.)

I. speculatrix (watcher). *fl.*, limb lilac, the divisions subequal, obovate, emarginate at the apex; the reflexing lamina of the falls half as long as the claw, which is spotted with violet and white at the throat, and furnished for its lower two-thirds with a simple yellow crest with purple spots; standards erect and plain lilac. April. *l.* linear, strongly ribbed, acute, minutely toothed, and hyaline at the edge. Stems under 1ft. high, bracteated by several reduced leaves. Greenhouse. Hong Kong, 1876. (B. M. 6306.)

I. spuria (spurious). *fl.* in sessile or nearly sessile clusters; limb bright lilac, 1½in. to 2in. long; falls with a round blade under 1in. broad, hardly at all deflexed, furnished with a bright yellow keel beginning at the base of the limb and running down the claw, which is faintly streaked with purple on a white ground; standards oblanceolate, shorter than the falls, bright lilac. June and July. *l.* erecto-patent, 1ft. long, ½in. broad. Stem 1ft. to 2ft. high, little branched, stout, sub-terete. Europe, Asia, Algeria, 1759. (B. M. 58.)

FIG. 331. IRIS SUSIANA.

I. squalens (daubed).* *fl.* in clusters, with a faint Elder-like scent; limb 2½in. to 3in. deep; falls obovate-cuneate, 1½in. broad, reflexing half-way down, upper part bright lilac-purple; beard bright yellow; standards length and breadth same as the falls, obovate-unguiculate, erect, rather crisped, dull lilac and yellow or brownish-yellow. May and June. *l.* tufted, ensiform, glaucous.

Iris—*continued.*

Stems 2ft. to 3ft. high, branched half-way down, bearing three or four clusters of flowers. Europe, Asia, 1768. (B. M. 787.) Two desirable varieties are *atro-purpurea* and *lavendulacea*.

I. stenogyne (with narrow-stigma). A synonym of *I. Guldenstädtiana*.

I. stylosa (large-styled). A synonym of *I. unguicularis*.

I. subbiflora (sub-two-flowered). A synonym of *I. biflora*.

I. susiana (Susian).* *fl.* solitary; limb 3in. deep; falls and standards similar in size and shape, with a round blade, 1½in. to 3in. broad, cuneately narrowed to a short claw, with dense fine spots and lines of brown-black on a whitish groundwork tinged with lilac; falls reflexing about half-way up, densely pilose down the claw, with a broad cushion of brown-black hairs; standards erect, much spotted on a groundwork of brighter lilac. April. *l.* ensiform, stem-clasping, pale green, rather firm. Stem 1ft. to 1½ft. high. Levant, 1573. A most distinct and beautiful species, requiring a slight protection in winter in colder parts of the country. See Fig. 331. (B. M. 91.)

I. Swertii (Swert's). *fl.* very fragrant; limb 2in. to 2½in. deep; segments pure white, 1in. broad, slightly veined with lilac, purple towards the edge; falls obovate-cuneate, with a yellow beard; standards obovate-unguiculate, much crisped, pure white, except the purple keel and border. May. *l.* ensiform, glaucous. Stem 1ft. to 1½ft. high, bearing three or four clusters of flowers, slightly branched. A handsome plant, the native country of which is unknown. (S. B. F. G. ser. ii. 254.)

I. tectorum (roof).* *fl.*, limb bright lilac, 1½in. to 2in. deep; falls above 1in. broad, very obtuse, crisped at the edge, marked with deep lilac veins on a paler lilac groundwork, narrowed cuneately into a claw half as long as the limb, which is variegated with lilac streaks on a white ground, the deeply laciniated white and lilac crest ½in. deep; standards spreading, rather shorter than the falls, with an orbicular plain lilac limb; spathe single, terminal, two or three-flowered. June. *l.* ensiform, pale green, about 1ft. long, thin. Stem 1ft. or more high. Japan, 1872. A rare, but distinct and beautiful, species. SYN. *I. tomiolopha*. (B. M. 6118; G. C. n. s., vi. 37.)

I. tenax (strong). *fl.* solitary; limb bright lilac-purple, 2in. to 3in. deep; falls obovate-unguiculate, with a reflexing blade ⅜in. to 1in. broad; standards nearly as long, ½in. broad, oblanceolate, with a long claw. May and June. *l.* two, linear, moderately firm. Stem 6in. to 12in. high, slender. North America, 1826. (B. M. 3343; B. R. 1218.) According to Douglas, the Indians make from the fibre derived from the leaves of this species "deer and elk snares sufficiently strong to take even the largest and most powerful of these animals; and it is also used by the women for making small bags and reticules, exactly the same as steel chain purses of fine workmanship, and for fishing."

I. tomiolopha (jagged-crest). A synonym of *I. tectorum*.

I. tridentata (three-toothed). *fl.*, limb lilac-purple, 2in. to 2½in. deep; falls obovate-unguiculate, 1in. or more broad, reflexing half-way down; claws white, veined with lilac; standards oblanceolate-spathulate, erect, about ½in. long; spathes two-flowered. May. *l.* ensiform, 1ft. to 1½ft. long. Stem slender, terete, hollow. North America, 1829. (B. M. 2886, under name of *I. tripetala*.)

I. tuberosa (tuberous).* Snake's Head. *fl.* solitary; limb 2in. to 2½in. deep; falls with an orbicular, obtuse, lurid purple, veinless lamina, ½in. to ⅝in. broad, not more than half as long as the oblong spathulate claw, which is greenish-yellow on both sides, and ⅜in. to 1in. broad at the middle; standards erect, under 1in. long, rhomboid, unguiculate; blade entire or tricuspidate; spathe with usually only a single large green valve, which often overtops the flower. April and May. *l.*, outer ones bract-like, lanceolate; inner ones two or three, weak, glaucous, tetragonal, erect. Stem weak, slender, hollow, about 1ft. long. Levant, 1597. A well-known species, and one of the earliest introduced into this country. (B. M. 531.)

I. unguicularis (clawed).* *fl.* solitary, fragrant; limb 3in. deep, bright lilac; falls obovate, 1in. broad, narrowed gradually into a linear claw, keeled with yellow and streaked with lilac on a white ground at the throat; standards nearly the same shape and size as the falls, lilac, erect. February. *l.* in a distichous basal tuft, linear, erect, firm. Plant stemless. Algeria. SYN. *I. stylosa* (under which name it is included in B. M. 5773).

I. variegata (variegated).* *fl.*, limb 2in. deep; falls oblong, cuneately narrowed to the base, ⅜in. broad; upper part deep claret-brown, middle much veined with brown on a yellow groundwork; beard bright yellow; standards erect, oblong-unguiculate, bright lemon-yellow. May. *l.* tufted, purple at the base, 1ft. to 1½ft. long, 1in. broad. Stem 1ft. to 1½ft. high, glaucous, forked low down, bearing three or four, one to two-flowered, terminal spathes. Eastern Europe, 1597. A handsome species, having several very desirable varieties. (B. M. 16.)

I. verna (spring). *fl.* solitary; limb 1½in. deep; segments oblong-unguiculate, both about ½in. broad; claw orange at the throat, spotted with black, and furnished with a central, slightly raised, scarcely villose line. Spring. *l.* linear, 6in. to 12in. long, slightly glaucous. Plant almost stemless. Southern United States, 1748. A scarce plant; several kinds are sold under this name. (S. B. F. G. 68.)

Iris—*continued.*

FIG. 332. IRIS VERSICOLOR, showing Habit and detached Portion of Inflorescence.

I. versicolor (various-coloured).* *fl.* clustered; limb claret-purple, under 2in. deep; falls obovate-unguiculate, reflexing half-way down; the roundish lamina ⅔in. to 1in. broad, cuneate at the base; standards oblanceolate-spathulate, light claret-purple. June. *l.* ensiform, rather glaucous. Stem 1ft. to 2ft. high, terete, forked low down, with two or three clusters of flowers beside the end one. North America, 1732. A common and handsome species. See Fig. 332. (B. M. 21.)

I. virescens (greenish). *fl.*, tube greenish-yellow, 1in. to 1¼in. long; limb 2in. deep; falls oblong, cuneately narrowed to a claw, ½in. to ⅝in. broad, greenish-yellow, streaked in the lower half with dull purple; beard bright yellow; standards oblong-unguiculate, dull yellow, ⅝in broad, the claw spotted and streaked with green and dull purple. April and May. *l.* as in *I. lutescens*. Europe. According to Mr. Baker, this is the least ornamental or attractive of all the bearded Irises.

FIG. 333. IRIS CAUCASICA.

I. virginica (Virginian). *fl.*, limb 2in. to 2½in. deep, bright lilac-purple; falls round-unguiculate, reflexed half-way down; lamina 1in. broad, 1in. to 1¼in. long; standards erect, oblanceolate-spathulate, deep lilac, less than ½in. broad. June. *l.* firm, 1½ft. to 2ft. long, about 1in. broad. Stem 2ft. or more high, forked, compressed towards the base, terete upwards. North America, 1758. (B. M. 703.)

Iris—*continued.*

Sect. II. Xiphions.

I. alata (winged).* *fl.*, tube cylindrical, 3in. to 6in. long; limb bright lilac-purple, 3in. deep; falls oblong, 1in. broad, bright yellow at throat; inner segments oblanceolate-spathulate, 1in. long, spreading horizontally; spathe sessile, with lanceolate valves, 3in. to 4in. long. October to December. *l.* sub-erect, lanceolate, acuminate, nearly 1ft. long. Spain, Algiers, &c., 1801. A strikingly handsome species. (B. R. 1876.)

I. anglica (English). A garden synonym of *I. Xiphioides*.

I. caucasica (Caucasian). *fl.* in one-flowered spathes, scentless; limb pale yellow, 1½in. deep; falls obovate, ½in. broad, reflexing only in the upper third; stigmas broad, pale yellow, with deltoid crests. February and March. *l.* four to five, sharply falcate, lanceolate. Stem one to three-flowered, or very short. Caucasus to Persia. See Fig. 333. (S. B. F. G. 255.)

I. filifolia (thread-leaved).* *fl.*, tube 1in. long above the ovary; limb bright deep purple, 2½in. deep; orbicular lamina of the falls 1in. deep, shorter than the panduriform claw, and keeled with bright yellow at the base; standards oblanceolate, erect; spathe 3in. to 4in. long, with pale green lanceolate valves. *l.* six or more; lower ones filiform, over 1ft. long; scarious outside ones at base of stem, flat, and mottled with deep purple. Stem slender, terete, 1ft. to 2ft. high, ending in a single spathe. Gibraltar, 1869. (B. M. 5928.) SYN. *Xiphion tingitanum* (of B. M. 5981, not of Baker).

FIG. 334. FLOWER AND LEAVES OF IRIS HISTRIO.

I. Histrio (actor).* *fl.*, tube 3in. to 4in. long, filiform, exserted; limb lilac-purple, 1½in. deep; falls copiously streaked and spotted with lilac on a paler ground, and keeled with yellow down the face; claw narrowed gradually from top to base; standards plain lilac, oblanceolate, erect; spathe one-flowered, sessile, in the centre of the leaf tuft; valves 3in. to 4in. long. February. *l.* about two to a tuft, and produced with several others, reaching 1ft. in length. Palestine, 1873. See Fig. 334. (B. M. 6033.)

I. juncea (rush-like). *fl.*, tube slender, 1in. to 1¼in. long; limb pale yellow, 1½in. to 2in. deep; lamina of falls orbicular, 1in.

Iris—*continued.*

broad, as long as the broad claw ; standards oblanceolate, erect, ¾in. broad ; spathe 2in. to 3in. deep, with lanceolate, acuminate valves. May and June. *l.* numerous, superposed, terete, under one line thick ; lower ones 1ft. long. Stems flexuose, terete, 1ft. to 1½ft. high, ending in a single spathe. North Africa, 1869. In Algeria, according to Mr. Baker, the bulbs of this species are eaten. (B. M. 6890.)

FIG. 335. IRIS PERSICA.

I. persica (Persian).* *fl.* violet-scented ; limb 1½in. to 2in. deep ; falls oblong-spathulate, ½in. broad, cuneate at the base, pale yellowish-lilac, with a bright yellow beardless keel, waved at the edges. February and March. Stem none. *l.* four or five in a basal tuft, linear, recurved, 2in. to 3in. long at the flowering season. Asia Minor to South Persia. See Fig. 335. (B. M. 1.)

I. reticulata (netted).* *fl.*, tube 2in. to 3in. long, exserted ; limb deep violet-purple, 1½in. deep ; lamina of falls oblong, half as long as the oblong-cuneate claw, with a narrow paler keel, violet-spotted, and with a narrow yellow line down the centre ; standards erect, oblanceolate ; spathe one-flowered, sessile. February and March. *l.* generally two to a tuft, as high as the flower at flowering time, and growing afterwards to a length of 1ft. or more, one line thick. Caucasus, &c. See Fig. 336. (B. M. 5577 ; L. B. C. 1829 ; R. G. 452 ; S. B. F. G. ser. ii. 189.)

FIG. 336. IRIS RETICULATA.

I. r. Krelagei (Krelage's). This "differs from the type in being nearly or quite inodorous, with a tube not exserted from the spathe, and the colour of the limb a more slaty-purple, with the yellow keel of the lamina of the falls fainter, and the claw not merely keeled in the centre, but variegated with blotches and lines that reach to the edge" (J. G. Baker).

I. tingitana (Tangierian).* *fl.*, tube 1½in. long ; limb lilac-purple, 3in. deep ; orbicular blade of falls shorter than the panduriform claw ; standards erect, oblanceolate ; spathes two-flowered, 5in. to 6in. deep, with lanceolate acuminate valves. *l.*, lower ones linear-complicate, over 1ft. long, ½in. broad after leaving the stem ; upper ones gradually smaller. Stem stout, terete, 2ft. to 3ft. high, ending in a single spathe. Tangiers, 1872. (B. M. 6775.)

Iris—*continued.*

I. vulgare (common).* *fl.*, tube scarcely any ; limb 2in. to 2½in. deep ; falls with an orbicular reflexing blade 1in. broad and deep, dashed with bright purple down the centre, and a broad erecto-patent claw ; standards purple, erect ; spathe valves 3in. to 4in. long. June. *l.* four or six below the spathe valves ; lowest 1ft. or more long, linear-sub-terete, deeply channelled ; upper ones gradually resembling the spathe valves. Stem 1ft. to 2ft. high, one or two-flowered. Portugal, 1596. See Fig. 337. (B. M. 686, under name of *I. Xiphium.*)

FIG. 337. IRIS VULGARE, showing Habit and detached Flower.

I. v. lusitanicum (Portuguese). *fl.* bright yellow, or more or less suffused with brown. (B. M. 679, under name of *I. lusitanica.*)

I. xiphioides (Xiphion-like).* *fl.*, limb deep lilac-purple, 2½in. to 3in. deep ; blade of falls round-oblong, flushed with yellow down the face, and rather exceeding the deltoid claw ; standards purple, erect, oblanceolate ; spathe about 3in. deep. July. *l.* about six in a basal tuft, and three or four from the stem below the spathe ; lower ones 1ft. long, linear, ⅜in. to ½in. broad, deeply channelled. Stem 1ft. to 2ft. high, two or three-flowered. Pyrenees. SYNS. *I. anglica*, of gardens, *Xiphion latifolium.* Of this species, there are numerous varieties in colour of flowers.

IRISH HEATH. *See* **Dabœcia polifolia.**

IRIS-ROOT. The same as **Orris-root** (which *see*).

IRON-TREE. *See* **Parrotia persica.**

IRON-WEED. *See* **Vernonia.**

IRONWOOD. A name applied in different countries to various trees with hard timber. In the United States, it is used for *Carpinus americana* and *Ostrya virginica.*

IRONWORT. *See* **Sideritis.**

IRREGULAR. Applied to flowers, the parts of which are dissimilar in size.

ISANDRA. Included under **Thysanotus** (which *see*).

ISATIS (the old Greek name, used by Dioscorides). ORD. *Cruciferæ.* This genus comprises from twenty-five to thirty species of erect, branched, annual or biennial herbs, spread over Southern Europe and Western Asia. Flowers often yellow, loosely racemose, ebracteate. Leaves entire, stem ones sagittate. The only species worthy of mention here is the one described below. Propagated by seeds sown in spring in almost any soil.

I. tinctoria (dyers'). Common Dyer's Woad. *fl.* yellow ; panicles loose, erect, elongated. Spring. *l.*, lower ones stalked, ovate ; upper ones sessile, sagittate, all more or less glaucous. *h.* 2ft. to 4ft. Europe (Britain), North Asia. An interesting biennial plant. The ancient Britains stained themselves with it ; later, the Saxons imported it. It is still cultivated in Lincolnshire. (Sy. En. B. 161.)

ISCHARUM (from *ischein*, to check; in reference to the impoverished nature of the upper portion of the spadix). ORD. *Aroideæ* (*Araceæ*). A small genus of greenhouse tuberous herbs, now united, by Bentham and Hooker, to *Biarum*, from which they differ only in botanical details. For culture, *see* **Typhonium.**

I. angustatum (narrow). *fl.*, sheaths nearly white, embracing the base and middle of the spathe; spathe 6in. long, sheathing part nearly white, gradually expanding into an erect, almost black-purple blade; spadix slender, the female portion very short, the neutral part ½in. long and white, the male part 1in. long and black-purple. December. *l.* long, thick, petiolate, oblong-lanceolate, sub-acute. Tuber the size of a small potato. Syria, 1860. (B. M. 6355.)

I. Pyrami (Pyramus). *fl.*, spathe dark velvety-purple, short, broad-lanceolate, long-acuminate, twisted; tube ventricose; spadix almost equal to the spathe. January. *l.* elliptic-subobovate, on long attenuated petioles, obtuse at apex, obliquely nerved. Syria, 1861. (B. M. 5324.)

ISERTIA (named after P. E. Isert, a German surgeon). SYNS. *Brignolia*, *Bruinsmania*. ORD. *Rubiaceæ*. A genus comprising fifteen species of shrubs or trees, natives of Brazil, Guiana, and New Grenada. Flowers scarlet or red, rarely white or yellow, rather large, in many-flowered, thyrsoid, terminal, corymbose cymes, shortly pedicellate. Leaves large, opposite, rarely ternate, verticillate, thick, coriaceous, acuminate. *I. coccinea*, perhaps the only species in cultivation, is a very handsome stove evergreen shrub, requiring a compost of peat and loam, with the addition of a little charcoal and silver sand. Increased by cuttings, inserted in sandy soil, in heat, during spring and summer.

I. coccinea (scarlet). *fl.* scarlet, velvety on the outside, 1in. long; thyrse terminal, many-flowered, panicled. July. *l.* oval, acuminated at both ends, downy beneath. *h.* 8ft. to 12ft. Guiana, 1820.

ISMELIA. Now included under *Chrysanthemum.*

ISMENE. Included under **Hymenocallis** (which *see*).

ISOCHILUS (from *isos*, equal, and *cheilos*, a lip; in allusion to the shape of the labellum). ORD. *Orchideæ*. A genus of four or five species of epiphytal stove orchids, ranging from Mexico and the West Indies to Brazil. Flowers rose or red, in one row, in spike-like racemes, small or medium; labellum free from the column, contracted at the base with a slight S-like curvature. Stems bearing the leaves in two rows. Perhaps the only species at present in cultivation is *I. linearis*. For culture, *see* **Pleurothallis.**

I. linearis (linear). *fl.* purplish, small, in short spikes. Spring. *l.* short, narrow, on tufted slender stems 1ft. high. Mexico, &c., to Brazil, 1791. (L. B. C. 1341.)

ISOLEPIS. This genus is now included, by the authors of the "Genera Plantarum," under **Scirpus** (which *see*).

I. gracilis (slender). A garden name for **Scirpus riparius** (which *see*).

ISOLOMA (from *isos*, equal, and *loma*, a border; lobes of corolla equal). SYN. *Kœhleria*. Including *Brachyloma*, *Calycostemma*, *Pearcea*, and *Tydæa*. ORD. *Gesneraceæ*. A genus comprising about sixty species of ornamental stove herbs, often confused with *Achimenes* and *Gesnera*, natives of the Western hemisphere, from Bolivia and Peru to Mexico. Flowers often scarlet, golden, or spotted. Leaves opposite, often softly villous. For culture, *see* **Gesnera.**

I. bogotense (Bogotan). *fl.* copious, rather large, drooping; corolla full yellow, rich red above, streaked and dotted with red within; tube funnel-shaped, gibbous above; limb spreading, five-lobed; calyx almost entirely free; peduncles single-flowered. Autumn and early winter. *l.* opposite and ternately verticillate, petiolate, ovate-cordate, serrate, rich velvety-green, mottled and reticulated with white or pale green, always whitest in the middle. Stems erect, but little branched, 1ft. to 2ft. high. Bogota, 1844. Plant hairy. SYN. *Achimenes picta* (under which name it is figured in B. M. 4126).

I. Ceciliæ (Cecilia Franchomme's).* *fl.* bright rose; inside of the tube white and spotted. *l.* dark velvety. *h.* 1ft. to 1½ft. Cundinamarca, 1877.

Isoloma—*continued.*

I. Deppeanum (Deppe's). *fl.* orange-red, in four-flowered villous umbels; corolla 1in. long, ½in. across, tubular, clavato-ventricose, dilated and somewhat fleshy at its base; limb spreading; lobes sub-equal. Summer. *l.* 3in. to 6in. long, 1¼in. to 2¼in. broad, opposite and decussate, petiolate, lanceolate, acuminate, serrated, harshly pubescent and bright green above, white with soft tomentum beneath. *h.* 2ft. to 3ft. Central America, &c. SYN. *Gesneria elongata* var. (under which name it is figured in B. M. 3725).

I. digitaliflorum (Foxglove-flowered). *fl.* very large, deflexed, corolla shaggy, rosy-purple above, white beneath; throat white, spotted with crimson; limb green, dotted purple; panicles short, terminal. *l.* large, ovate-acuminate, hairy. Stems erect, hairy. New Grenada.

I. hondense (Honda).* *fl.*, calyx cup-shaped, five-toothed, tipped with red; corolla yellow, 1in. or more long, tubular, sub-ventricose; mouth contracted; limb of five short, equal, spreading lobes; tube clothed with bright red hairs; peduncles longer than the flower, axillary, solitary, or two or three together, hairy. December. *l.* opposite, spreading, ovate, acute or sub-acuminate, serrate, hairy; petioles ½in. to ¾in. long. Stem erect, 1ft. long. Honda, New Grenada, 1845. This plant may, by a little management in forcing or retarding the tubers, be made to blossom at almost every season of the year. SYN. *Gesneria hondensis* (under which name it is figured in B. M. 4217).

I. hypocyrtiflorum (Hypocyrta-flowered). *fl.* orange-red, velvety-pubescent, nearly globose, about 1in. long; mouth nearly closed. *l.* cordate-ovate, bluntish, velvety, emerald-green, traversed by silvery ribs. Ecuador, 1866. SYN. *Gloxinia hypocyrtiflora* (under which name it is figured in B. M. 5655).

I. Lindenianum (Linden's). *fl.* white; throat marked on the lower side by a deep violet band; upper lip with a dash of yellow and a narrow zone of purple; tubes short. *l.* ovate, hairy, olive-green; costa and principal veins marked by broad silvery stripes, and having bright green veins intervening. Stems erect, hairy. Ecuador, 1868.

I. molle (soft). *fl.* three to five in an umbel, on extremely short peduncles; corolla red, densely hairy, funnel-shaped; lobes of limb orange, spotted with red, acute, reflexed. Winter. *l.* clothed with long, dense, silky hairs. Stems 1½ft. high, shrubby, hairy. Caraccas, 1819. SYN. *Gesneria mollis* (under which name it is figured in B. M. 3815).

I. ocellatum (eyleted). *fl.*, calyx hairy, tube red; corolla bright red, drooping, pubescent; limb campanulate, segments marked with white spots, bearing a black dot in the centre; peduncles red, erect, slender, shorter than the leaves. Winter. *l.* large, opposite, ovate, acuminate, copiously reticulated with veins, and wrinkled; under side purple; upper side dark shining green, glabrous; edges serrated; petioles 1in. or more long, purple. Panama, 1847. Stove. SYN. *Achimenes ocellata* (under which name it is figured in B. M. 4359).

I. pictum (painted). *fl.* in a terminal, elongated, leafy raceme; corolla scarlet, yellow beneath and at the mouth, very hairy and velvety; lobes of limb spotted. Summer till late autumn. *l.* opposite or ternate, ovate, acuminate, serrated, hairy, rich red-purple beneath. *h.* 3ft. Columbia, 1848. (B. M. 4431, under name of *Gesneria picta.*)

I. Schiedeanum (Schiede's). *fl.* copious from the axils; corolla rich scarlet, between campanulate and infundibuliform, clothed with long hairs; limb five-lobed, yellow, streaked with dotted lines of red; calyx short, turbinate, tomentose; peduncles aggregated, shorter than the leaves, one or three-flowered. November. *l.* generally in whorls of three, soft and downy above, paler and tomentose beneath. Stem tinged with red. *h.* 1½ft. Mexico, 1844. (B. M. 4152, under name of *Gesneria Schiedeana.*)

I. Seemanni (Seemann's). *fl.*, calyx shallow, cup-shaped; corolla bright brick-red, a little inclining to orange; tube orange at base, short, nearly cylindrical; limb spotted with deep red, and clothed with glandular hairs; peduncles hairy. October. *l.* opposite and ternate; lower ones large, broadly ovate or sub-ovate, coarsely serrate, acute, on rather long petioles; upper ones gradually smaller. Stem simple, 2ft. or more high. Panama, 1848. SYN. *Gesneria Seemanni* (under which name it is figured in B. M. 4504).

I. triflorum (three-flowered). *fl.* in umbels of three, on solitary axillary peduncles; corolla yellow, ventricose, densely clothed with shaggy red hair; mouth spotted; limb five-lobed; calyx woolly, hemispherical. Summer. *l.* opposite, 4in. to 6in. long, ovate, acuminate, serrate, upper surface dark green, wrinkled with copiously reticulated nerves, and downy beneath, on woolly petioles. *h.* 1½ft. to 2ft. New Grenada, 1846. SYN. *Gesneria triflora* (under which name it is figured in B. M. 4342).

ISOLOMA (of J. Smith). *See* **Lindsaya.**

ISOMERIS (from *isos*, equal, and *meris*, part; the petals, stamens, and pistils are of equal length). ORD. *Capparideæ*. A monotypic genus. The species is a half-hardy deciduous shrub, having a disagreeable odour, a long tap root, and a very spreading head. It thrives

Isomeris—*continued.*

best in a compost of sandy loam and leaf mould. Propagated in autumn, by cuttings of ripe shoots.

I. arborea (tree-like). *fl.* yellow, large, in terminal racemes; petals four, equal, sessile. May. *l.* trifoliolate, lanceolate, mucronulate, glabrous. Stem thick, very knotty. *h.* 10ft. California, 1839. (B. M. 3842.)

ISONANDRA (from *isos*, equal, and *aner, andros*, the stamen; number of fertile and barren stamens equal). ORD. *Sapotaceæ*. A genus comprising six species of glabrous or pubescent milk-bearing trees, natives of India and Ceylon. Flowers small, inconspicuous, produced in little clusters, either in the angles of the leaves or at the ends of the young branches. Leaves entire, leathery. The species described below is a stove evergreen tree, of great commercial value and utility. It thrives in a compost of sandy peat and fibry loam. Increased by cuttings, inserted in sandy soil, under a bell glass, in heat.

I. gutta (Gutta). Gutta-percha Tree. *fl.* inconspicuous, disposed in small axillary or terminal clusters. *l.* entire, coriaceous. Borneo, 1847. The correct name of this tree, which yields the well-known Gutta-percha of commerce, is *Dichopsis gutta*.

ISOPLEXIS (from *isos*, equal, and *pleko*, to plait; the upper segment of corolla is equal in length to the lip). SYN. *Callianassa*. ORD. *Scrophularineæ*. A genus comprising two species of very handsome greenhouse evergreen shrubs. Flowers in terminal pedunculate racemes; corolla tubular at the base, campanulate; upper segment of limb equal in length to the lip, and, like it, incumbent in æstivation. The species thrive in a compost of sandy loam and leaf mould. Half-ripened shoots will root, during spring, in sand, under a bell glass.

I. canariensis (Canary). *fl.* golden-yellow, dense; segments of the corolla acute. June. *l.* permanent, lanceolate, serrated. *h.* 4ft. to 6ft. Canary Islands, 1698. SYN. *Digitalis canariensis*. (B. R. 48.)

I. sceptrum (sceptre). *fl.* yellowish-brown, dense; segments of corolla obtuse. July. *l.* obovate-lanceolate, denticulated. *h.* 3ft. to 4ft. Madeira, 1777. SYN. *Digitalis sceptrum*. (S. E. B. 73.)

ISOPOGON (from *isos*, equal, and *pogon*, a beard; referring to the beard-like fringes on all parts of the inflorescence). ORD. *Proteaceæ*. A genus comprising about twenty-nine species of greenhouse evergreen shrubs, limited to extra-tropical Australia, and having the habit of *Petrophila*. Flowers yellow, pink, or lilac, in dense spikes or cones, each flower sessile, within a bract or scale; the cones hemispherical, globular, or ovoid, terminal, or rarely axillary. Leaves rigid, entire or divided, terete or flat, and sometimes broad. For culture, *see* **Protea**. The following is a selection of the species introduced:

I. anemonifolius (Anemone-leaved). *fl.*, perianth yellow, glabrous, except the terminal tufts of short hairs; cones sessile, solitary, or in clusters of two or three at the ends of the branches, nearly globular. July. *l.* on rather long petioles, once or twice trifid or pinnately divided, with linear or linear-acute, entire, bi- or trilobed segments. *h.* 4ft. to 6ft. 1791. (L. B. C. 1337; B. M. 697, under name of *Protea anemonifolia*.)

I. attenuatus (attenuated). *fl.*, perianth pale yellow; laminæ villous outside; the tube glabrous, or nearly so; cones terminal or in the upper axils, sessile, depressed, globular. April. *l.* oblong-spathulate to almost linear, with a small straight or hooked point, much narrowed into the petioles, thick, and almost veinless. *h.* 2ft. to 3ft. (B. M. 4372.)

I. Baxteri (Baxter's). *fl.*, perianth pink, very villous; cones depressed, globular, terminal, often clustered amongst numerous floral leaves. April. *l.* from broadly cuneate, undulate, and toothed only at the end, to twice or thrice three-lobed. *h.* 2ft. 1831. (B. M. 3539.)

I. cuneatus (cuneate). *fl.*, perianth pale purple, glabrous, or with small tufts at the lips of the laminæ; cones terminal, depressed, globular. June. *l.* from obovate-oblong to lanceolate or oblanceolate, obtuse, with a small callous point, rather thick, obscurely veined. *h.* 7ft. to 8ft. 1830. (B. M. 3421, under name of *I. Loudoni*.)

I. longifolius (long-leaved). *fl.*, perianth yellow, silky-villous; cones terminal, sessile, ovoid or at length globular. April. *l.* long, linear or oblanceolate, obtuse with a small callous or acute point, narrowed into a long petiole. *h.* 2ft. to 8ft. 1823. (B. R. 900.)

Isopogon—*continued.*

I. roseus (rose). *fl.*, perianth pink, glabrous, tipped with small tufts of hairs; cones terminal, globular, solitary or clustered. April. *l.* once or twice ternately divided or shortly pinnate; the segments linear or cuneate, entire or three-lobed, rigid, flat, concave or channelled, acute, but scarcely pungent. *h.* 1ft. to 4ft. 1840. (B. M. 4037, under name of *I. scaber*.)

I. sphærocephalus (globe-headed). *fl.*, perianth tube glabrous; the laminæ densely hirsute, with yellow hairs; cones solitary and terminal, or two or three crowded at the ends of the branches, globular. March. *l.* linear or almost lanceolate, obtuse, with a short callous point, slightly contracted towards the base, but sessile; margins often recurved, and the midrib prominent beneath. *h.* 4ft. (B. M. 4332.)

ISOPYRUM (from *isos*, equal, and *Pyros*, Wheat; a Greek name applied to another plant). Including *Enemion* and *Leptopyrum*. ORD. *Ranunculaceæ*. This genus contains about seven species of dwarf, slender perennial herbs, natives of the temperate regions of the Northern hemisphere. Flowers white, solitary or loosely paniculate. Leaves ternate, decompound; leaflets stalked, three-lobed, or cut, membranous. The only species in cultivation is *I. thalictroides*, which is a very graceful little subject, with foliage resembling a Maidenhair Fern. It looks extremely pretty when grown on rockwork or a border, and thrives in almost any moderately good garden soil. Propagated by seeds; or by division of the roots, in autumn.

FIG. 338. ISOPYRUM THALICTROIDES, showing Habit and detached Leaflet.

I. thalictroides (Thalictrum-like).* *fl.* white, small; sepals blunt. Spring. *l.*, leafstalks dilated at the base into membranous auricles. Root creeping, fascicled, or grumose. *h.* 9in. to 15in. Europe, 1759. See Fig. 338.

ISOTOMA (from *isos*, equal, and *toma*, a section; segments of corolla equal). ORD. *Campanulaceæ*. A genus comprising eight species of stove or greenhouse herbaceous perennials, formerly included under *Lobelia*. Flowers in axillary or terminal racemes. Leaves alternate, entire, largely dentate or pinnatifid. For culture, *see* **Lobelia**.

I. axillaris (axillary-flowered). *fl.* blue; corolla flat, with long green tubes; peduncles axillary, elongated, and one-flowered. Autumn. *l.* sessile, pinnatifid, toothed. *h.* 1ft. Australia, 1824. Greenhouse perennial. (B. M. 2702, under name of *Lobelia senecioides*.)

I. a. subpinnatifida (sub-pinnatifid) has the laciniæ of the leaves longer than in the type, and not unfrequently again pinnatifid. SYN. *I. senecioides subpinnatifida* (under which name it is figured in B. M. 5073).

I. Brownii (Brown's). *fl.* purple, racemose. Autumn. *l.* linear, quite entire. Stems almost simple. *h.* 1ft. West Australia, 1829. Greenhouse annual. (B. M. 3075, under name of *Lobelia hypocrateriformis*.)

Isotoma—*continued.*

I. longiflora (long-flowered). *fl.* white; tube of corolla very long and slender. Summer. *l.* obovate-lanceolate, coarsely toothed, pubescent. West Indies, 1752. Greenhouse perennial. A very poisonous plant. (B. R. 1200, under name of *Lobelia longiflora.*)

I. senecioides subpinnatifida (Senecio-like, sub-pinnatifid). A synonym of *I. axillaris subpinnatifida.*

ISOTROPIS (from *isos*, equal, and *tropis*, a keel; in reference to the shape of the carina). ORD. *Leguminosæ.* A genus of eight species of greenhouse herbs or under-shrubs, with diffuse or ascending stems. Flowers solitary, on axillary peduncles, or forming a loose terminal raceme. Leaves alternate, simple or unifoliolate, with linear-falcate or minute stipules. The species are all Australian. *I. striata*, perhaps the only one in cultivation, requires treatment similar to **Chorizema** (which *see*).

I. striata (striated). *fl.*, standard yellow with purple streaks, large; wings and keel purple. Spring. *l.* not numerous; lower ones obovate or cuneate, very obtuse, truncate or broadly two-lobed; upper ones narrower, and sometimes acute. Some branches quite leafless and dichotomous. *h.* 6in. to 18in. A hairy perennial or under-shrub. SYN. *Chorizema spartioides* (under which name it is figured in L. B. C. 1953).

ITEA (from *Itea*, the Greek name of the Willow, as far back as Homer; applied to this genus on account of the quick growth of the species named below). ORD. *Saxifrageæ.* A genus comprising about five species of trees and shrubs, natives of North-west America, Japan, China, Java, the Himalayan Mountains, and Khasia. Flowers white, small. Leaves alternate, petiolate, oblong or lanceolate, glandulose-dentate or crenate. The only representative of this genus yet introduced is *I. virginica*, an ornamental hardy deciduous shrub, which, when in a vigorous condition, during autumn, is entirely covered with its racemes of white flowers. It thrives best in a moist sandy or peat soil. Increased, in spring, by seeds, or by suckers; and, in summer, by layers.

I. virginica (Virginian). *fl.* white; racemes simple, terminal. June. *l.* alternate, simple, oblong, pointed, minutely serrate. *h.* 6ft. to 7ft. North America, 1744. (B. M. 2409.)

IVY. *See* **Hedera.**

IXANTHUS (from *Ixos*, Mistletoe, and *anthos*, flower; in reference to the glutinous nature of the flower). ORD. *Gentianeæ.* A monotypic genus. The species is an erect greenhouse biennial herb, native of the Canary Islands. It thrives in well-drained fibrous loam, and requires a light, airy place in a cool greenhouse. Propagated by seeds, sown in spring.

I. viscosa (clammy). *fl.*, corolla yellow, salver-shaped; tube white, twice the length of the calyx; limb five-cleft. June and July. *l.* ovate-lanceolate, quite entire, three or five-nerved; upper ones often connate. Branches opposite, crossed. Stem erect. *h.* 1ft. to 1½ft. Canaries. (B. M. 2135, under name of *Gentiana viscosa.*)

IXAUCHENUS. A synonym of **Lagenophora** (which *see*).

IXIA (from *ixia*, the Greek name used by Theophrastus for birdlime; referring to the clammy juice). SYN. *Würthia.* Including *Morphixia.* ORD. *Irideæ.* A genus containing about twenty-five species of pretty greenhouse (or hardy in sunny, sheltered, dry spots, in the extreme south of Britain) bulbous plants, all natives of South Africa. Flowers in simple or branched spikes; perianth tube long, slender; limb regular, salver-shaped. Leaves narrow, ensate. Stems slender, simple or slightly branched. Propagation is readily effected by seeds; or by offsets, which are freely produced. Seeds should be sown in pans of sandy soil, about September, and placed in a cool frame. The young plants may remain in the seed-pans for the first year, when they should be either potted singly or planted out. It takes from three to four years before they flower. By growing a number of varieties together, and saving their seed, numerous other sorts may be obtained, usually much varied in colour, and in the markings of the flower. Propagation by

Ixia—*continued.*

offsets is a much quicker method, as the plants then generally flower the second year. Offsets may be secured in quantity after the parent Ixias have ripened off, and they should be stored in a dry place, until starting time, the following autumn.

Cultivation in Pots. Ixias, cultivated as pot plants, are very attractive, and admirably adapted for conservatory and cool greenhouse decoration, in early summer. The bulbs should be potted rather firmly, in sandy loam and leaf soil, during October, placing about six or eight in a 5in. pot, and covering them with 1in. of soil. The pots may then be plunged or stood on ashes in a cool frame, and but little water will be required throughout the winter. When the flower-spikes appear, more water may be given, and the plants fully exposed to light and plenty of air: draughts, however, must be avoided. After flowering, growth and a gradual ripening should be encouraged, by keeping the plants watered for a time. When the leaves die away, the bulbs may be shaken out and stored in bags until the autumn, or they may be allowed to remain in the soil and be kept dry.

Where the cultivation of Ixias is attempted outside, a well-drained, sunny, south border should be selected, and the bulbs planted about 6in. deep, in autumn. They should be lifted annually after being ripened, unless the locality is favourable enough to ensure their safety when left outside. Ixias do not require much heat, and, moreover, do not succeed well in a high temperature.

I. aulica (courtly). *fl.* rose-coloured, numerous; spathe almost equal to the tube. April. *h.* 2ft. 1774. SYN. *Morphixia aulica.* (B. M. 1013, under name of *I. capillaris aulica.*)

I. candida (white). A synonym of *I. leucantha.*

I. capillaris (capillary).* *fl.* flesh-colour or lilac; spathe scarious, membranous, paper-like, having five rib-like streaks ending in as many teeth. April. *h.* 1½ft. 1774. SYN. *Morphixia capillaris.* (B. M. 617.)

I. columellaris (pillar-formed). *fl.* striped; filaments united at base. August. *h.* 6in. 1790. (B. M. 630.)

I. flexuosa (bending-stalked). *fl.* pink; tube slender, a little enlarged; limb below bell-shaped, contracted. April and May. *h.* 2ft. 1757. (B. M. 624.)

I. fucata (painted). *fl.* pink, salver-shaped; tube clavate, straight; spike one or two-flowered. June and July. *l.* grass-like. *h.* 1ft. 1779. (B. M. 1379.)

I. hybrida (hybrid).* *fl.* white; raceme flexuose, many-flowered. April and May. *l.* slender. *h.* 1ft. 1757. (B. M. 127, under name of *I. flexuosa.*)

I. leucantha (white-flowered). *fl.* white, one-sided; spathes toothed, shorter than the tube. May. *l.* linear-ensiform. *h.* 1½ft. 1779. SYNS. *I. candida, I. patens leucantha.*

I. linearis (linear). *fl.* scentless; outer valve of spathe subtruncate, streaked with three brown veins ending in short teeth; segments of perianth striped with three longitudinal darker-coloured veins. April. SYN. *Morphixia linearis.* (B. M. 570, under name of *I. capillaris gracillima.*)

I. maculata (spotted).* *fl.* orange-coloured; limb spreading, spotted at base; stigmas not divided lower than base of anthers. April and May. *h.* 1ft. 1757. (B. M. 539, under name of *I. conica.*)

I. m. ochroleuca (yellowish-white). *fl.* cream-coloured, in spiked heads; tube shorter than segments. May and June. *l.* linear-ensiform. *h.* 2ft. 1780. (B. M. 539; A. B. R. 50, under name of *I. capitata.*)

I. monadelpha (monadelphous). *fl.* blue; filaments united in a tube. April and May. *h.* 6in. 1792. (B. M. 607.)

I. odorata (sweet-scented).* *fl.* yellow, very fragrant; corolla salver-shape; limb longer than the spathe; segments almost equal; spike many-flowered. May and June. *h.* 1ft. 1757. SYN. *Morphixia odorata.* (B. M. 1173, under name of *I. erecta lutea.*)

I. patens (spreading-flowered).* *fl.* pink; tube filiform; limb bell-shaped, spreading; stigmas longer than the anthers. April. *h.* 1ft. 1779. (B. M. 522.)

I. p. leucantha (white-flowered). A synonym of *I. leucantha.*

I. polystachya (many-spiked). *fl.* variegated; limb spreading, not spotted; stigmas divided as low as the tube. May and June. *h.* 1½ft. 1757. (A. B. R. 155.) There is a variety *flavescens.*

I. reflexa (reflexed). A synonym of *Tritonia scillaris.*

I. speciosa (showy).* *fl.* dark red; limb hemispherical, campanulate; stigmas longer than the anthers. May and June. *h.* 6in. 1778. (B. M. 594, under name of *I. crateroides.*)

Ixia —*continued.*

I. viridiflora (greenish-flowered).* *fl.* green, spotted at base; scape many-spiked, many-flowered. May and June. *l.* linear-ensiform, edged. *h.* 1ft. 1780. (B. M. 549, under name of *I. maculata viridis.*) There are two varieties: *cana* (B. M. 789, under name of *I. maculata amethystina*) and *cæsia* (A. B. R. 530, under name of *I. maculata cæsia*).

IXIOLIRION (from *Ixia*, and *Leirion*, a Lily; Ixia-like Lily). SYN. *Kolpakowskia.* ORD. *Amaryllideæ.* A genus of two species of elegant half-hardy bulbous plants, with loose racemes of large trumpet-shaped flowers, and narrow, grass-like leaves. Probably the two species here mentioned are simply forms of one. They thrive best in an open, dry, sunny, and well-drained border, and the most suitable soil is a light loamy one. If cultivated outside, the protection of a handlight is needful, when commencing growth, in spring. The bulbs may be carefully lifted in the autumn, and stored away in a dry place.

I. Kolpakowskianum (Kolpakowski's). *fl.* blue or white; perianth trumpet-shaped, with a long, slender tube, and six narrow-acute segments. Summer. *l.* linear. *h.* 1ft. Lake Sairan, 1878. SYN. *Kolpakowskia ixiolirioides.* (R. G. 953.)

I. montanum (mountain). A synonym of *I. tataricum.*

I. Pallasi (Pallas's). A synonym of *I. tataricum brachyantherum.*

I. tataricum (Tartar). *fl.* blue; segments more or less spreading or recurved; inflorescence sometimes paniculate. June. *l.* broadly linear. *h.* 1ft. to 1½ft. Central Asia, &c., 1844. SYN. *I. montanum.* (B. R. 1844, 66.)

FIG. 339. IXIOLIRION TATARICUM BRACHYANTHERUM, showing Habit, Raceme, and detached Flower.

I. t. brachyantherum (short-stamened). *fl.* beautiful deep blue, 2in. in diameter; umbel terminal. Summer. *l.* linear-lanceolate. Stem erect. *h.* 1½ft. 1874. SYN. *I. Pallasi.* See Fig. 339. (R. G. 910.)

I. t. Ledebourii (Ledebour's). This differs from the type principally in the curvature of the anthers after flowering. Central Asia, 1880. (R. G. 1014.)

IXODIA (from *ixodes*, viscid; in reference to the viscid secretions on the plant). ORD. *Compositæ.* A monotypic genus. The species is a glabrous greenhouse evergreen shrub, from Australia. It thrives in a compost of sandy peat and a little fibry loam. Propagated in May, by cuttings of the young shoots, getting hard at their base, inserted in sand, under a bell glass, in a close frame or pit.

I. achilleoides (Achillea-like). *fl.-heads* in a dense terminal corymb, very much resembling those of *Achillea*, the white, petal-like, radiating laminæ of the inner involucral bracts being similar to the ray-florets of that genus; involucre glutinous, with green centres, and often slightly woolly. June. *l.* linear-lanceolate or slightly spathulate, usually acute, mostly above 1in. long, more or less decurrent on the stem. *h.* 1½ft. 1803. (B. M. 1534.)

IXORA (the name of a Malabar idol, to which the flowers of some of the species are offered). SYNS. *Siderodendron, Sideroxyloides.* ORD. *Rubiaceæ.* A genus comprising about 100 species of stove evergreen shrubs

Ixora—*continued.*

or small trees, natives, for the most part, of the tropical regions of Asia and Africa, and rarely of America, Australia, and the Islands of the Pacific. Flowers scarlet, pink, or white, handsome, in terminal corymbs; corolla salver-shaped; tube long, slender. Leaves opposite, rarely ternate, verticillate, coriaceous, petiolate or sessile. Ixoras are amongst the most handsome and gorgeous of stove flowering plants. They are usually of a compact bushy habit, requiring but little training, and the foliage itself is by no means unattractive. Propagation is readily effected by cuttings: these should be short-jointed, and moderately firm, and be inserted singly in small pots, which should afterwards be plunged, in a close frame, with a bottom heat of about 80deg., and kept shaded. Roots will, as a rule, soon be emitted; the plants may then be inured to the open house, and placed in 5in. pots. If kept in a high temperature, and supplied with plenty of moisture, they soon grow. Some of the species and hybrids flower in this size, and are very attractive. A compost of fibry peat, a little leaf soil, and plenty of silver sand, is most suitable for Ixoras at all stages of their growth. It should be made rather fine for cuttings, and used in a rough state for established plants. Almost any amount of heat and moisture may be applied to these subjects in summer; but a cooler and somewhat drier atmosphere should be maintained in autumn and winter, for ripening the wood. Young plants succeed and grow freely, if plunged in a bed of fermenting material; but this should not be allowed to become very hot. A little shade from bright sunshine is advisable in summer time; but in dull weather, and at other seasons, all possible light should be admitted.

I. acuminata (pointed-leaved). *fl.* pure white, fragrant, large; tube 1½in. long; corymbs decompound, crowded, almost sessile. *l.* petiolate, broad-lanceolate, acuminated, smooth. *h.* 3ft. to 6ft. India.

I. barbata (bearded). *fl.* in terminal sub-corymbose panicles; calyx tube reddish-green, globose; corolla tube greenish-white, 1½in. long, slender, a little curved; limb pure white within; mouth encircled with a delicate fringe of hairs. July. *l.* elliptic-oblong, acute, penninerved, sub-coriaceous, glossy, short, petioled; stipules ovate, acuminate. *h.* 6ft. Andaman Islands, &c., 1823. Stove. (B. M. 4513.)

I. chelsoni (Chelsea).* *fl.* bright orange-salmon, shaded with pink; corymbs very large, full, round. Summer. A very handsome garden hybrid, having a profuse-flowering and dwarf-branching growth.

I. coccinea (scarlet).* *fl.* bright red, disposed in very large heads or corymbs, which are umbellate; tube of corolla nearly 2in. long. Summer. *l.* sessile, cordate, oblong, acute, shining. *h.* 3ft. to 4ft. East Indies, 1814. An elegant plant. SYN. *I. grandiflora* (B. R. 154.)

I. c. Bandhuca (Bandhuca). *fl.* deep scarlet; tube over 1in. long; corymbs contracted. Summer. *h.* 2ft. to 4ft. India, 1815. (B. R. 513.)

I. c. superba (superb). A handsome variety, having deeper-coloured flowers, and much broader and thicker petals, than the typical species. It is also of a more vigorous growth. Java, 1846.

I. Colei (Cole's).* *fl.* pure white, numerously produced in large round corymbs. *l.* dark green, roundish. A very handsome strong, free, and robust growing garden hybrid, remaining in flower for a considerable length of time. A cross between *I. coccinea* and *I. stricta alba.*

I. concinna (neat).* *fl.*, when first expanding, of a bright salmon-colour, gradually changing to deep salmon-pink, disposed in large and compact corymbs. An extremely handsome garden hybrid of 1882.

I. congesta (crowded). *fl.* bright orange, corymbose. Summer. *l.* broad-oblong. *h.* 4ft. Tenasserim, 1845. (B. M. 4325, under name of *I. Griffithii.*)

I. decora (decorous). *fl.* yellow, flaked with rosy-crimson, very large, disposed in noble corymbs. A handsome and attractive garden form. 1882.

I. Dixiana (Dixie's). *fl.* dark orange; corymbs very large. A handsome seedling form, of a good hardy constitution, and free-flowering habit. 1868.

I. Duffii (Duff's). A synonym of *I. macrothyrsa.*

I. floribunda (abundant-flowering). *fl.* reddish-scarlet, disposed in large dense corymbs. An excellent garden variety, of robust growth.

Ixora—*continued.*

I. Fraseri (Fraser's).* *fl.* brilliant flamed salmon-colour; corolla tubes carmine-scarlet; corymbs numerous, large, terminal, globular. *l.* rich dark green. A most effective and beautiful garden variety, of free and vigorous growth.

I. fulgens (glittering).* *fl.* clear orange-scarlet; corymbs dense, terminal. *l.* on short petioles, linear-lanceolate, acuminated. *h.* 3ft. to 4ft. Java, &c. A most desirable species. (B. M. 4523, under name of *I. salicifolia.*)

I. grandiflora (large-flowered). A synonym of *I. stricta.*

I. javanica (Java).* *fl.* orange; corymbs dense, on long peduncles, trichotomous. Summer. *l.* ovate-oblong, acuminated. *h.* 3ft. to 4ft. Java, 1846. Very distinct and desirable. (B. M. 4586.)

I. lanceolaria (lance-leaved). *fl.* greenish-white, rather lax, in terminal, pedunculate, trichotomously-branched corymbs. April. *l.* patent, often 9in. long, lanceolate, acuminate, somewhat coriaceous; nerves running parallel, and almost at right angles with midrib; stipules small, erect. *h.* 2ft. India, 1847. Stove. (B. M. 4399.)

I. laxiflora (loose-flowered). *fl.* very fragrant, small, handsome, in large, terminal, singularly trichotomous panicles; calyx deep red; corolla white, tinged with pink; tube 1½in. long, slender, cut to the base into four spreading segments. Summer. *l.*, largest 9in. long, oblong-lanceolate, acuminate, shortly petioled. *h.* 3ft. to 4ft. Upper Guinea. (B. M. 4482.)

I. macrothyrsa (large-thyrsed).* *fl.* deep red, becoming tinged with crimson as they get older, in immense trusses. *l.* ample, attaining 10in. in length, beautiful deep green. South Sea Islands, 1878. A fine plant. SYN. *I. Duffii* (under which name it is figured in Gn. April 6, 1878).

I. odorata (fragrant). *fl.* pure white, quickly changing to yellow-brown, deliciously fragrant, 4in. to 5in. in length, in large, terminal, much-divided panicles, 1ft. or more in diameter. May. *l.* fine dark green, opposite, ample, broadly-ovate or obovate-lanceolate, spreading, 6in. to 12in. long, acute or rather acuminate, entire, coriaceous; lower ones tapering to a footstalk; upper ones smaller, more ovate, sessile. *h.* 3ft. Madagascar, 1844. (B. M. 4191.)

I. picturata (painted). A distinct and handsome hybrid between *I. Williamsii* and *I. stricta*, having leaves and growth after the style of the former, with the fine compact corymb of flowers of the latter. 1880.

I. Pilgrimii (Pilgrim's).* *fl.* bright orange-scarlet, shaded with crimson; corymbs perfectly round, about 7in. in diameter. A hybrid from *I. Williamsii*, having the same fine constitution, and, like it, not requiring so much heat, by 10deg. to 15deg., as *I. coccinea*, and most others. It is one of the finest forms yet produced. 1880. (F. M. n. s. 428.)

I. princeps (chief).* *fl.* buff-white, changing to a deep reddish-orange, produced in the greatest profusion. *l.* 6in. to 7in. long, by 2in. wide. Java. A fine exhibition species.

I. profusa (profuse). *fl.* rosy-salmon colour, very freely produced, densely disposed in enormous corymbs. A handsome garden variety, admirably adapted for exhibition and general decorative purposes. 1882.

I. regina (queen).* *fl.* rich violet-salmon colour, disposed in large dense corymbs. *l.* ovate, acuminate. A very handsome and distinct garden variety, not unlike *I. Williamsii*, but dwarfer and more compact.

I. sanguinea (bloody). *fl.* crimson, shaded with deep violet, numerously disposed in large corymbs. A distinct garden variety, with ample deep green foliage.

I. splendens (splendid).* *fl.* bright coppery-scarlet, intensely brilliant; corolla tube 1¼in. long; corymbs very large. *l.* elliptic-obtuse, 3½in. long, 1½in. wide. A handsome garden variety.

I. stricta (upright). *fl.* light orange; tube of corolla ⅔in. to 1in. long; cymes many-flowered, decompound, crowded. Summer. *l.* firm, oval-lanceolate, much attenuated. *h.* 2ft. to 3ft. Moluccas and China, 1822. (B. R. 782, under name of *I. crocata.*)

I. s. rosea (rose-coloured). *fl.* pale pink, becoming reddish as they grow old, terminal, axillary, in large, round, lax, supra-decompound cymes; limb segments oblong-cuneate, acute. Summer. *l.* dark shining green, sub-sessile, oblong, acute, narrowed towards the base, with an obsolete sinus; under surface villous. *h.* 4ft. Bengal, 1819. (B. M. 2428.)

I. s. rutilans (ruddy). A much-improved garden form of the type, having larger and more compact heads of fine crimson-red flower tubes, and rich orange or salmon-red lobes. It has a free and vigorous style of growth. *I. s. Prince of Orange* is a fine variety, with cinnabar-red flowers, raised by Messrs. Veitch and Sons. (R. G. 1015.)

I. Thwaitesii (Thwaites'). *fl.* very compact, erect; corolla white or cream-colour, hypocrateriform; tube slender, 1¼in. long; limb speading, ⅔in. in diameter; corymb terminal, short-peduncled, trichotomous. May. *l.* sub-coriaceous, opposite, 3in. to 8in. long, 1in. to 4in. broad, broad-lanceolate, but variable, abruptly acuminate; petiole scarcely two lines long; stipules reddish. *h.* (in native country) 10ft. to 20ft. Ceylon, 1859. (B. M. 5197, under name of *I. jucunda.*)

I. undulata (wavy). *fl.* white; tube of corolla ½in. long; panicle terminal, compound, having its branches corymbose at the apex.

Ixora—*continued.*

Summer. *l.* elliptic or lanceolate, acuminated, undulated. *h.* 3ft. to 4ft. Bengal, &c., 1820.

I. Williamsi (Williams's).* *fl.* reddish-salmon, in large heads. A free-growing and profuse-flowering form, of garden origin.

JABOROSA (derived from the Arabic word *Jabarose*, which was applied to the Mandrake, from its affinity to that plant). ORD. *Solanaceæ.* A genus comprising six or seven species of pretty greenhouse or hardy herbaceous perennials, one of which is from Mexico and the rest from the Andes and extra-tropical South America. Flowers white or yellowish, solitary; corolla campanulate or tubular. Leaves dentate, runcinate-pinnatifid, or dissected. The species thrive in a light sandy-loam soil. Increased by divisions of the plant; or by seeds, sown during spring. Cuttings of young shoots will root under a handlight. The only species yet introduced to cultivation is the one here described.

J. integrifolia (entire-leaved). *fl.* white; corolla 2in. long, with acute segments; scapes length of petioles. *l.* petiolate, oval, nearly entire. *h.* 6in. Buenos Ayres. A pretty little hardy plant, forming a mass of deep green foliage; it thrives in a southern aspect. (B. M. 3489.)

JACARANDA (the name of one of the species in Brazil). SYNS. *Icaranda, Kordelestris.* ORD. *Bignoniaceæ.* A genus comprising about thirty species of ornamental stove shrubs and trees, somewhat resembling in habit the fine-leaved species of *Acacia.* Flowers blue or violet, showy, panicled, usually terminal; corolla tubular at the base, much dilated above, campanulate, ventricose beneath. Leaves opposite, bipinnate. *J. mimosifolia* is, probably, the best-known of the two or three species in cultivation. It thrives in a compost of sandy peat and fibry loam; plenty of drainage is most essential. Cuttings of half-ripened shoots will root, during the early summer months, in sand over sandy peat; they should be placed in heat, and kept shaded until well rooted. The same treatment will answer with the second species.

J. mimosifolia (Mimosa-leaved). *fl.* blue, drooping; panicles large, terminal, naked, erectly pyramidal; corolla silky. Early summer. *l.* about 1½ft. long, bipinnate, with many pairs of opposite pinnæ, each pinna bearing ten to twenty-eight pairs of trapezoid-oval-oblong, mucronate, downy leaflets. *h.* 10ft. Brazil, 1818. Shrub. (B. R. 631; B. M. 2327, under name of *J. ovalifolia.*)

J. tomentosa (downy). *fl.*, corolla dark purple, downy externally, with a short tube; limb tubular-campanulate, 1½in. long, with a pale spot under the upper lip. June. *l.* bipinnate, downy; leaflets with an odd one, ovate-rhomboid, acute, very unequal. *h.* 20ft. Mexico, 1824. Shrub. (B. R. 1103.)

JACINTH. A name for the Hyacinth.

JACK-IN-A-BOX. *See* **Hernandia.**

JACKSONIA (named after George Jackson, a Scotch botanist). ORD. *Leguminosæ.* A genus comprising about twenty-eight species of rigid, greenhouse, leafless, shrubs or sub-shrubs, all natives of Australia. Flowers yellow, mixed with purple, small, in lateral or terminal racemes or spikes, or scattered along the branches; bracts small, scale-like. Leaves replaced by very minute scales at the nodes. Branches rigid, terete, angular or winged. The species thrive in a peat and loam soil. Cuttings of half-ripened shoots will root in sand, under a hand glass, during April. Jacksonias are very rarely seen in cultivation.

J. scoparia (broom-like). *fl.* yellow, disposed in one-sided racemes, either terminal or from the upper nodes. Summer. Branches angular. *h.* 2ft. to 6ft. 1803. Plant arborescent, unarmed. This tree is known in New South Wales as Dogwood, on account of the offensive smell emitted by its wood when burning. (L. B. C. 427.)

JACK-TREE. A common name of **Artocarpus integrifolia** (which *see*).

JACOBINIA (derivation doubtful). Including *Cyrtanthera, Pachystachys, Sericographis.* ORD. *Acanthaceæ.* A genus comprising about thirty species of stove erect herbs or shrubs, natives of tropical America, from Brazil

Jacobinia—*continued.*

and Bolivia as far as Mexico. Flowers often yellow, red or golden, rarely pale or rose. Leaves opposite, entire. For culture, *see* **Justicia** (to which the genus is allied).

J. aurea (golden). This is the correct name of the plant described in this work under the name of *Cyrtanthera catalpæfolia.*

J. carnea (flesh-coloured). *fl.* flesh-coloured; thyrse compact; bracts and sepals ovate-lanceolate. August and September. *l.* on rather long petioles, ovate-acuminate. *h.* 6ft. Rio Janeiro, 1827. (B. M. 3383; B. R. 1397, under name of *Justicia carnea.*)

J. chrysostephana (golden-crowned). This is the correct name of the plant described in this work as *Cyrtanthera chrysostephana.*

J. coccinea (scarlet). *fl.* scarlet; spikes terminal; helmet lanceolate, reflexed at the end; stigma of two plates. February. *l.* elliptical. *h.* 5ft. South America, 1770. (B. M. 432, under name of *Justicia coccinea.*)

J. Ghiesbreghtiana (Ghiesbreght's).* *fl.* scarlet, in terminal panicles. Winter. *l.* bright green, glabrous, ovate-lanceolate, entire. *h.* 1ft. to 1½ft. Mexico, 1843. (R. G. 97b, under name of *Sericographis Ghiesbreghtiana.*) A very handsome winter-flowering decorative plant.

J. Lindeni (Linden's). *fl.* orange-yellow, disposed in showy terminal heads. *l.* oval-acuminate, glabrous. Stem smooth. Mexico, 1870. (R. H. 1870, 250, under name of *Justicia Lindeni.*)

JACOB'S LADDER. *See* **Polemonium cæruleum.**

JACQUEMONTIA (named after Victor Jacquemont, 1801-1832, a French naturalist, and traveller in the East Indies). ORD. *Convolvulaceæ.* This genus comprises about thirty-six species of stove twining or prostrate herbs or sub-shrubs, one being a native of tropical Africa, and the rest tropical American. Flowers blue, white, or rarely violet, sometimes loosely or densely cymose, sometimes capitate, rarely solitary or loosely racemose. Leaves entire, often cordate, rarely dentate or lobed. The species here described are, perhaps, the only ones yet introduced. For culture, *see* **Ipomœa.**

J. canescens (hoary). *fl.* blue, in dense-flowered pedunculate cymes; sepals oblong, obtuse. June and July. *l.* oblong-cordate, on long petioles. *h.* 6ft. Bogota, 1846. Plant downy, scabrous. (B. R. 1847, 27, under name of *Convolvulus canescens.*)

J. violacea (violet). *fl.* pale blue, sessile; peduncles umbelled, five-flowered. July to September. *l.* oblong-cordate, acuminate, sub-repand, smooth. *h.* 6ft. Mexico to Brazil, 1808. (B. M. 2151, under name of *Convolvulus pentanthus.*)

JACQUINIA (named in honour of Nicholas Joseph de Jacquin, 1727-1817, an eminent botanist, once Professor of Botany at Leyden). ORD. *Myrsineæ.* A genus comprising about five or six species of very pretty stove evergreen shrubs, natives of tropical America, allied to *Theophrasta.* Flowers white, yellow, or purplish, terminal, racemose, or solitary; corolla campanulate. Leaves scattered, obtuse or verticillate, quite entire, with revolute edges, crowded at the tops of the branches. The species thrive in a compost of sandy peat, to which may be added a small quantity of fibry loam. Increased, during summer, by cuttings of ripened shoots, placed in sand, in a moist bottom heat, and covered with a bell glass.

J. armillaris (bracelet). *fl.* white, racemose or rather corymbose. June. *l.* cuneate-spathulate or obovate-oblong, obtuse or retuse, sometimes mucronulate, nearly veinless; margins somewhat revolute. West Indies, &c., 1768. Shrub or tree. This species is known by the West Indian settlers as Bracelet-wood, the shiny brown and yellow seeds being made into bracelets.

J. aurantiaca (orange-flowered). *fl.* orange, racemose. April to September. *l.* obovate-lanceolate, acuminated, ending in a pungent point. Branches sub-verticillate. *h.* 3ft. to 6ft. Sandwich Isles, 1796. (B. M. 1639.)

JAGGED. Cut in a coarse manner.

JALAMBICEA. A synonym of **Trianea** (which *see*).

JALTOMATA. A synonym of **Saracha** (which *see*).

JAMAICA EBONY. *See* **Brya Ebenus.**

JAMAICA PEPPER. A name given to Allspice, **Pimenta officinalis** (which *see*).

JAMBOSA. Now included under **Eugenia** (which *see*).

JAMESIA. (named after Dr. Edwin James, an American botanist, who first discovered the plant). ORD. *Saxifrageæ.* A monotypic genus, the species being a very

Jamesia—*continued.*

pretty hardy shrub. It thrives well in any ordinary garden soil, if such is perfectly drained. Increased by seeds; or by cuttings of ripened shoots, placed in sandy loam.

J. americana (American). *fl.* white, about ½in. in diameter, disposed in terminal paniculate cymes. June. *l.* opposite, serrated. Rocky Mountains, Colorado, 1865. A very neat dwarf-growing plant. (B. M. 6142.)

JAMESIA (of Nees). A synonym of **Stephanomeria** (which *see*).

JAMESONIA (named after Dr. William Jameson, Professor of Botany at Quito). ORD. *Filices.* A monotypic genus. The species is a greenhouse fern. Sori oblong, placed on the flabbelate veins on the back of the pinnæ, remote from the edge. For culture, *see* **Ferns.**

J. imbricata (imbricated). *rhiz.* woody, creeping, black, tortuose. *sti.* wiry, slender, 3in. to 4in. long. *fronds* 6in. to 18in. long, two to three lines broad, pinnate; pinnæ close, roundish, often spreading horizontally; edge much incurved. Andes, from New Grenada to Peru.

JANIPHA. *See* **Manihot.**

JAPAN CEDAR. *See* **Cryptomeria.**

JAPAN MEDLAR. *See* **Photinia japonica.**

JASIONE (derived from a name applied by Theophrastus to the Convolvulus). Sheep's Scabious. ORD. *Campanulaceæ.* A genus (about twelve species have been described) of hardy herbaceous plants, from temperate Europe and the Mediterranean regions. Flowers collected into terminal bracteated heads; corolla blue, rarely white, deeply five-parted; anthers combined into a tube at the base. Leaves alternate, narrow. The species form very pretty little subjects for the rock garden. They thrive best in a somewhat sandy soil. The perennials are propagated by sowing seed during the autumn, and by divisions; the annuals by seeds, which require to be sown in March.

J. montana (mountain). *fl.* pale blue, sometimes white, disposed in globose heads; peduncles naked. Summer. *l.* lanceolate, undulated, hairy. Stem erect, simple. *h.* 6in. to 12in. Europe (Britain). Annual. (Sy. En. B. 683.) The sea-side form of this species (*littoralis*) is generally biennial.

J. perennis (perennial). *fl.* blue, pedicellate, disposed in large sub-globose heads; peduncles naked. Summer. *l.* rather hairy; radical ones obovate; cauline ones oblong-linear, flat. Stems erect, simple. *h.* 1ft. Western Europe, 1787. An elegant perennial. (B. M. 2198; B. R. 505.)

JASMINANTHES. A synonym of **Stephanotis** (which *see*).

JASMINE. *See* **Jasminum.**

JASMINEÆ. A tribe of **Oleaceæ** (which *see*).

JASMINUM (its Arabic name). Jasmine. One, and by far the most important, of the three genera forming the TRIBE *Jasmineæ* of ORD. *Oleaceæ.* About 120 species have been described: they are stove, greenhouse, or hardy, evergreen or deciduous shrubs, usually of trailing habit. Flowers showy, often very fragrant; corolla white or yellow, salver-shaped. Leaves opposite or rarely alternate, trifoliolate, impari-pinnate, or simple. Jasminums are well-known and very popular plants, on account of their elegant habit, and the perfume emitted by the flowers of many species. They may all be propagated from cuttings of firm wood. The tender species should be inserted in sandy or peaty soil, and placed under a hand glass, in heat; the hardy sorts succeed in a similar inclosure, without heat. *J. gracillimum* is an excellent winter-flowering, stove or warm greenhouse plant, well adapted for cultivation in pots or hanging baskets. *J. Sambac* may be similarly treated, but its double form is of somewhat straggling growth, and does best when planted out and trained to a pillar. The flowers of these species are white, and highly fragrant. *J. grandiflorum* is a fine warm greenhouse species, and *J. nudiflorum, J. officinale,* and *J. revolutum* merit special notice for covering walls, arbours, &c., outside. Hardy Jasmines thrive in any fairly good garden soil; the stove and green-

Jasminum—*continued.*

house species succeed in a compost of about equal parts loam and peat.

J. auriculatum (auriculate). *fl.* white; corolla seven-parted. May to September. *l.* mostly simple, ovate, some trifoliolate; leaflets ovate, lateral ones small. *h.* 10ft. India to Mauritius, 1790. Stove climber. (B. R. 264.)

J. azoricum (Azores). *fl.* white; petals five, equal in length to the tube. Summer and autumn. *l.*, leaflets ovate and sub-cordate, undulated. Branches terete. Azores, 1724. Greenhouse shrubby twiner. (B. M. 1889.)

J. didymum (twin). *fl.* pure white, ½in. to ⅔in. long; cymes scattered along slender panicles, which usually much exceed the leaves, and are axillary or terminal on short branches. Winter. *l.* trifoliolate, very variable in size and form; leaflets oblong, ovate, or orbicular, rarely ovate-lanceolate and acute or acuminate, coriaceous and shining, acute or rounded at the base, usually feather-nerved, and also three-nerved at the base. Tropical Australia and the Pacific Islands. An elegant hothouse climber, usually glabrous and shining, but sometimes more or less pubescent, especially on the inflorescence. (B. M. 6349.)

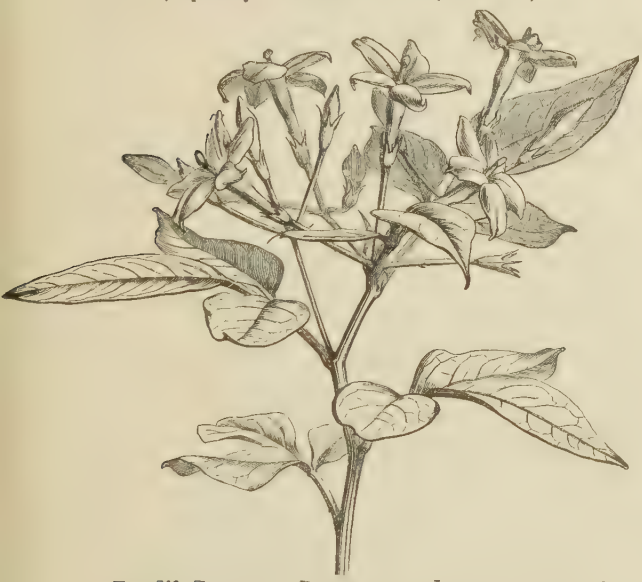


FIG. 340. FLOWERING BRANCHLET OF JASMINUM FLORIDUM.

J. floridum (florid). *fl.* yellow, ½in. in diameter, in lax cymes; calyx teeth long, subulate. *l.* alternate, pinnately trifoliolate. Japan and China, 1884. A hardy ornamental shrub. See Fig. 340. (B. M. 6719.)

J. fruticans (shrubby). *fl.* yellow, with oblong, obtuse petals. Summer. *l.* alternate, ternate, and simple; leaflets obovate or cuneiform, obtuse. Branches angular. *h.* 10ft. to 12ft. South Europe, 1570. A hardy evergreen shrub. (B. M. 461.)

J. gracile (slender). A synonym of *J. simplicifolium.*

J. gracillimum (very slender).* *fl.* white, large, sweet-scented; petals nine, elliptic-oblong; panicle many-flowered, globose, drooping. Winter. *l.* opposite, petiolate, ovate-cordate, acute, hirsute. Northern Borneo, 1881. A most desirable and elegant small-growing stove species, with long, slender branches. (B. M. 6559.)

FIG. 341. FLOWERING SPRAY OF JASMINUM GRANDIFLORUM (reduced).

Jasminum—*continued.*

J. grandiflorum (large-flowered).* *fl.* white, reddish underneath. June to October. *l.* opposite, pinnate; leaflets bluntish, outer three to five confluent. Wild at 2000ft. to 5000ft. elevation in sub-tropical North-western Himalaya. Cultivated widely throughout the tropics. 1629. A warm greenhouse bush (hardly a climber), very like *J. officinale*, but differing in the equal size of the leaflets, and in the exterior ones being confluent, also in the larger flowers See Fig. 341. (B. R. 91.)

J. hirsutum (hairy). A synonym of *J. pubescens.*

J. humile (humble). *fl.* yellow, with oblong, obtuse segments; peduncles terminal, twin, or tern, three-flowered. Summer. *l.* alternate, acute, trifoliolate or pinnate. Branches angular. *h.* 3ft. to 4ft. India, 1656. Hardy deciduous shrub. (B. R. 350.)

J. multiflorum (many-flowered). A synonym of *J. pubescens.*

FIG. 342. FLOWERING BRANCH OF JASMINUM NUDIFLORUM.

J. nudiflorum (naked-flowered).* *fl.* yellow, solitary, opposite. Winter. *l.* small, ternate. Branches flexible, green. China, 1844. A well-known and most desirable hardy deciduous climber, producing its flowers in great abundance throughout the winter months. It thrives in almost any situation, and grows with great rapidity. See Fig. 342. (B. M. 4649.)

J. odoratissimum (sweetest-scented). *fl.* yellow, with five oblong-obtuse segments; peduncles terminal, by threes, three-flowered. Summer. *l.* alternate, bluntish, ternate and pinnate. Branches terete. Madeira, 1656. Hardy climber. (B. M. 285.)

FIG. 343. SMALL INFLORESCENCE OF JASMINUM OFFICINALE.

Jasminum—*continued.*

J. officinale (officinal).* Common White Jessamine. *fl.* white, fragrant; corolla four or five-cleft. June to September. *l.* opposite, pinnate; leaflets ovate, acuminated, terminal one the longest. Branches angular. Northern India to Persia, 1548. See Fig. 343. Of this well-known and deservedly popular hardy climber, there are golden and silver-edged-leaved, and double-flowered varieties, which are, however, all inferior to the type. (B. M. 31.)

FIG. 344. INFLORESCENCE OF JASMINUM OFFICINALE AFFINE (natural size).

J. o. affine (related) differs from the type in more copious inflorescence, and larger flowers. Probably of garden origin. See Fig. 344. (R. H. 1878,87.)

J. paniculatum (paniculate). *fl.* white, in terminal panicles. January. *l.* ternate, oval, obtusely acuminate. *h.* 5ft. China, 1818. Stove evergreen climber. (B. R. 690; L. B. C. 469.)

J. pubescens (downy). *fl.* pure white, large, fragrant; petals six to nine, lanceolate; umbels terminal, sessile. Summer. *l.* cordate, mucronate, tomentose beneath and on the petioles; upper ones forming an involucre round the umbel. China and India, 1759. Plant sarmentose, downy. Greenhouse straggling shrub. SYNS. *J. hirsutum* (B. M. 1991), *J. multiflorum* (A. B. R. 496.)

J. pubigerum (down-bearing). *fl.* yellow, with five or six obtuse petals; peduncles elongated, one-flowered, terminal, sub-corymbose, downy. Summer and autumn. *l.* alternate, pinnate; leaflets seven, ovate-lanceolate or oblong-acuminate, sessile, downy while young. North-west India, 1827. A nearly hardy evergreen climbing shrub, closely allied to *J. revolutum*, but with smaller flowers.

J. revolutum (revolute-leaved).* *fl.* bright yellow, very fragrant, with five obtuse petals; corymbs terminal, compound. May to October. *l.* alternate, pinnate; leaflets five to seven, ovate-lanceolate or elliptic, glabrous, on short petioles. India, 1812. A greenhouse or hardy evergreen climbing shrub. Botanically, a form of *J. humile*, but distinct for horticultural purposes. (B. M. 1731.)

J. Sambac (Sambac or Arabian).* *fl.* white, fragrant, usually disposed in small trichotomous cymes. *l.* almost sessile, membranous, from cordate to oblong, acute or obtuse, waved. India, 1665. A well-known and handsome evergreen stove twining shrub, producing flowers nearly all the year round. (B. R. 1.) There are two or three varieties, including a double-flowered form. (B. M. 1785.)

J. simplicifolium (simple-leaved). *fl.* white, terminal; corolla six to eight-parted; segments linear, acute, equal to the tube. June and July. *l.* oblong, polished. Australia, &c., 1800. Stove climber, or sometimes a tree. (B. M. 980.) SYN. *J. gracile* (B. R. 606).

J. undulatum (wavy). *fl.* white; cymes dense; calyx teeth subulate, pubescent. January. *l.* simple, cordate-oblong, shining. *h.* 5ft. India and China, 1819. Stove climber. (B. R. 436.)

JATEORHIZA (from *iatos*, healing, and *rhiza*, a root; in allusion to the medicinal qualities of the plant). ORD. *Menispermaceæ*. A genus comprising two or three species, natives of tropical Africa or Madagascar. The only one worthy of mention here is *J. Calumba*. For culture, *see* **Cocculus** (to which it is allied).

J. Calumba (Calumba). *fl.*, corolla pale green. *l.* alternate, the younger ones thin, pellucid, bright green, generally three-lobed, upwards gradually more numerous. Stems annual, herbaceous. Root perennial, consisting of a number of fasciculated, fusiform, somewhat branched, fleshy, curved, descending tubers. Mozambique. This plant furnishes the well-known Calumba-root, a drug much esteemed as a bitter tonic, where a stimulant or astringent effect is not required; it is often employed in cases of indigestion, dependent upon languor and want of tone in the stomach, and attended by nausea and flatulence. SYN. *J. palmata*. (B. M. 2970, under name of *Cocculus palmatus*.)

Jateorhiza—*continued.*

J. palmata (palmate). A synonym of *J. Calumba*.

JATROPHA (from *iatros*, physician, and *trophe*, food; in allusion to the medicinal qualities of the species). ORD. *Euphorbiaceæ*. A rather large genus (nearly seventy species) of tall stove herbs and shrubs, rarely trees (principally of economic value), widely distributed throughout warm regions, but most abundant in South America. Flowers in cymes. Leaves alternate, stipulate. Jatrophas thrive in a sandy-peat and fibry-loam compost. Cuttings of firm young shoots, dried before insertion, will strike in sandy soil, if placed in a brisk bottom heat.

J. integerrima (entire-leaved). *fl.* red; racemes sub-cymose. May to August. *l.* ovate, acuminate, indistinctly lobed at base, rather hairy. *h.* 3ft. Cuba, 1809. (B. M. 1464.)

J. multifida (many-cleft). *fl.* green. July. *l.* palmate, eleven-lobed, smooth; lobes pinnatifid, cuneate; stipules setaceous, multifid. *h.* 3ft. South America, 1696.

J. panduræfolia (fiddle-leaved). *fl.* scarlet. May to August. *l.* oblong, sub-panduriform, acuminate, entire, angular at base, with two teeth on each side. *h.* 4ft. Cuba, 1800. (B. M. 604.)

J. podagrica (gouty-stalked).* *fl.* orange-red; cymes on long peduncles, terminal; teeth of calyx and lobes of corolla blunt. Summer. *l.* peltate-cordate, five-lobed, glabrous; lobes sub-ovate, blunt; stipules glandularly fringed. Stem erect, branched, gouty at base. *h.* 1½ft. New Grenada, 1847. (B. M. 4376.)

J. urens (stinging). *fl.* slender. June to September. *l.* roundish-cordate, three to five-lobed; the divisions toothed, cut, or even pinnatifid, often discoloured. *h.* 2ft. to 4ft. Tropical America, 1880. (G. C. n. s., xiv. 753.)

JEFFERSONIA (named after T. Jefferson, 1743-1826, at one time President of the United States of America). ORD. *Berberideæ*. A genus comprising two species of hardy perennial herbs, the one from North America, the other from Mandschuria. Flowers white, solitary; scape naked. Leaves radical, and for the most part bilobed or bipartite. The species best known to cultivation is *J. diphylla*, a very desirable plant. It thrives in a sandy-peat soil, in the rockery or border, and in rather shady situations. Propagated by divisions; or by seeds, which should be sown so soon as ripe.

J. diphylla (two-leaved). *fl.* white, solitary, about 1in. across; petals eight; stamens yellow. Spring. *l.* profoundly cleft into two lobes. *h.* 3in. to 6in. Tennessee, 1792. (B. M. 1513.)

JENKINSIA. Now included under *Acrostichum*.

JENKINSONIA. Now included under **Pelargonium** (which *see*).

JERDONIA (named after Surgeon-Major T. C. Jerdon, an eminent ornithologist). ORD. *Gesneraceæ*. A monotypic genus, the species being a small stove herbaceous perennial. It thrives best in a sandy-loam soil, and in a moist atmosphere. Propagated by seeds, sown in bottom heat.

J. indica (Indian). *fl.*, rosy-lilac, small; corolla funnel-shaped, five-lobed; scape erect, terminal, bearing two or three flowers. Autumn. *l.* in a dense tuft, cordate, obtuse, petiolate, dark green, blotched with pale green along the ribs and principal veins. *h.* 3in. Neilgherri Mountains, 1870. (B. M. 5814.)

JERUSALEM ARTICHOKE. *See* **Artichoke, Jerusalem.**

JERUSALEM SAGE. *See* **Phlomis fruticosa.**

JERUSALEM THORN. *See* **Parkinsonia aculeata.**

JESSAMINE. *See* **Jasminum officinale.**

JOB'S TEARS. *See* **Coix.**

JOINT. In horticultural parlance, that portion of the stem from which a leaf is given off is called a Joint.

JOLIFFIA. A synonym of **Telfairia** (which *see*).

JONESIA. A synonym of **Saraca** (which *see*).

JONQUIL. *See* **Narcissus Jonquilla.**

JONQUILLA. Included under **Narcissus** (which *see*).

JOSEPHA AUGUSTA. *See* **Bougainvillea spectabilis.**

JOVELLANA. Included under *Calceolaria.*

JOVE'S FRUIT. *See* **Lindera melissæfolia.**

JUANULLOA (named conjointly after G. Juan and Antonio Ulloa, two Spaniards, who travelled in Peru and Chili). SYNS. *Laureria, Ulloa.* ORD. *Solanaceæ.* A genus comprising six or seven species of erect or epiphytal stove shrubs, natives of Peru, Columbia, and Central America. Flowers sometimes solitary or few, shortly pedicellate; sometimes several, loosely cymose; calyx large, inflated, coloured. Leaves entire, coriaceous. Juanulloas thrive in a rough peaty soil. Cuttings will root in sand, under a bell glass, in bottom heat. *J. parasitica* is the one best known to cultivation.

J. eximia (extraordinary). *fl.* green, in pairs, very large, drooping, between funnel and bell-shaped, about 6in. long. *l.* oval, firm, glossy, entire, shortly acuminate. Shrub. (B. M. 5092.) This plant really belongs to the genus *Dyssochroma.*

J. parasitica (parasitic).* *fl.* orange; racemes dichotomous, pendulous. May. *l.* oblong, acuminated, alternate, thickish. *h.* 3ft. Peru, 1840. (B. M. 4118.)

JUBÆA (named after Juba, a King of Numidia). Coquito Palm of Chili. ORD. *Palmæ.* A monotypic genus, the species being a greenhouse palm. Flowers dark yellow, inclosed in a double spathe, and disposed in branching spikes. Fruit roundish, inclosing a hard one-seeded nut. Jubæa thrives best in a compost of one-half rich loam, and the remainder of leaf mould and sand. It is a very handsome plant, and is well adapted for sub-tropical gardening. Increased by seeds.

FIG. 345. JUBÆA SPECTABILIS.

J. spectabilis (remarkable).* *l.* pinnate, spreading, 6ft. to 12ft. long; pinnæ 1ft. to 1½ft. long, about 1in. wide, springing in pairs from nearly the same spot, and standing out in different directions; petioles very thick at the base, inclosed in a dense mass of rough brown fibres. Trunk, when developed, tall, straight, bearing the crown of large leaves. *h.* 40ft. to 60ft. Chili, 1843. The most southern of American palms. From the sap—obtained by felling the tree—boiled to the consistency of treacle, a syrup, called Palm-honey, is prepared, which is in considerable request in Chili. See Fig. 345. (G. C. n. s., xviii. 401.)

JUDAS-TREE. *See* **Cercis.**

JUGLANDEÆ. An order of trees or shrubs with watery or resinous juice, natives, for the most part, of North America. Male flowers in catkins; perianth

Juglandeæ—*continued.*

two, three, or six-parted, with a scaly bract; female flowers in terminal clusters, or in loose racemes, with distinct or united bracts; perianth adherent, three to five-parted. Fruit a dry drupe, with a strong and often two-valved endocarp; seed exalbuminous, two to four-lobed at the base. Leaves alternate, pinnate, stipulate. The wood of several of the species of *Juglans* is much prized by cabinet makers; and the bark of *Juglans cinerea* is used as a purgative in America. There are about five genera and thirty species. Illustrative genera are: *Carya* and *Juglans.*

FIG. 346. CLUSTER OF FRUITS OF JUGLANS AILANTIFOLIA.

JUGLANS (the old Latin name used by Pliny, contracted from *Jovis Glans*, the Nut of Jupiter). Walnut. ORD. *Juglandeæ.* A genus of seven or eight species

FIG. 347. JUGLANS CINEREA, showing (1) Female Flower, (2) Fruits and (3) Male Catkins.

Juglans—*continued.*

of hardy or half-hardy deciduous trees, widely dispersed over the temperate and sub-tropical regions of the Northern hemisphere. Flowers inconspicuous, deciduous; males in single catkins, and having a calyx of three to six irregular lobes; female flowers solitary, or a few in a group, terminal upon a shoot. Fruit having a fleshy, fibrous epicarp, bursting irregularly; endocarp two-valved, furrowed. Leaves compound, alternate, exstipulate. The species thrive in almost any kind of fertile soil, provided the sub-soil be dry and the site moderately sheltered. For general culture, &c., see **Walnut.**

J. ailantifolia (Ailantus-leaved). *fl.* greenish, males in long, slender catkins. Spring. *fr.* violet-red when young, numerous, in pendulous clusters, woolly. *l.*, leaflets sessile, truncate at the base, thin, soft, shortly toothed, green above, paler beneath. Origin uncertain. See Fig. 346.

J. cinerea (ashy-grey).* Butter Nut. *fl.* greenish. Spring. *fr.* oblong-ovate, with a tapered tip, downy, covered with viscid matter in small transparent glands, pendulous on a flexible peduncle. *l.*, leaflets fifteen to seventeen, lanceolate, rounded at the base, serrate, tomentose beneath; lateral ones sessile. *h.* 30ft. to 60ft. United States, 1656. See Fig. 347. (B. M. Pl. 247.)

FIG. 348. FRUITING BRANCH OF JUGLANS REGIA.

FIG. 350. FRUIT OF JUGLANS REGIA LONGIROSTRIS.

J. nigra (black).* *fl.* greenish. Spring. *fr.* globose, roughish, with minute prominent points, situated upon a short inflexible peduncle. *l.*, leaflets thirteen to seventeen, cordate-acuminate, unequal at the base, serrated, somewhat downy. *h.* 60ft. United States, 1656. (W. D. B. ii. 158.)

J. regia (royal).* Common Walnut-tree. *fl.* greenish. Spring *fr.* with a green husk, oval, situated upon a short inflexible

FIG. 349. LEAF AND NUT OF JUGLANS REGIA ELONGATA.

Juglans—*continued.*

peduncle. *l.*, leaflets five to nine, oval, glabrous, obscurely serrated. *h.* 40ft. to 60ft. Persia, 1562. A well-known and desirable fruit. See Fig. 348. It has several varieties, for enumeration of which, and for culture, *see* **Walnut.**

J. r. Bartheriana (Barther's). A synonym of *J. r. elongata.*

J. r. elongata (elongated). This variety only differs in its very much elongated fruits. A nut (natural size) is represented at Fig. 349. SYN. *J. r. Bartheriana.*

J. r. longirostris (long-beaked). This is an extraordinary seminal variety of the common Walnut, distinguished by its long-beaked fruits. See Fig. 350.

JUJUBE. *See* **Zizyphus Jujuba.**

JULIANA. A synonym of **Choisya** (which *see*).

JULUS. *See* **Millipedes.**

JUNCEÆ. A natural order, containing about 130 species of perennial, rarely annual, herbs, principally natives of temperate and Arctic regions. Flowers green or brown, in axillary or terminal cymes, regular, hermaphrodite or dicœcious, bracteolate; perianth inferior, scarious or coriaceous, the six segments in two series, the inner series sometimes petaloid, sometimes both series large and coloured; stamens six, rarely three only. Leaves slender, flat or terete, or reduced to sheathing scales. Stems erect, usually simple, sometimes septate within; pith often thick, continuous or interrupted. There are fourteen genera; *Juncus* and *Luzula* represent the order in the British Flora. The more important of the exotic genera are: *Calectasia*, *Kingia*, *Xanthorrhœa*, and *Xerotes.*

JUNCUS (from *jungo*, to join; the leaves and stems of this genus having been employed as cordage). Rush. ORD. *Junceæ.* A genus of about a hundred species of hardy, annual or perennial herbs, usually with a rigid habit, principally natives of Arctic and temperate regions. Flowers greenish or brownish, small, disposed in heads or panicles. Very few species of this genus are worth cultivating. The perennials thrive in almost any boggy situation, and may easily be increased by divisions of the root.

J. effusus spiralis (wide-spread spiral). A curious and desirable variety, forming spreading tufts of stems, which, instead of growing straight, like those of other kinds, are curiously twisted in a regular corkscrew form. From its very unusual appearance, it is well worthy of cultivation, and may be planted with advantage on the margins of pieces of water, near cascades, &c., or in an artificial bog.

J. lætevirens (bright-green).* *l.* bright green, in crowded tufts, somewhat distichously sheathing at the base, and distinctly compressed at the sides. *h.* 3ft. Japan, 1880. A free-growing and exceedingly ornamental hardy plant. This is probably not a Juncus at all.

J. zebrinus. *See* **Scirpus Tabernæmontani zebrinus.**

JUNE BERRY. An American name for *Amelanchier.*

JUNIPER. *See* **Juniperus.**

JUNIPER MOTH (*Thera juniperata*). One of a small genus of slender-bodied moths, of the group called Geometers, because of the peculiar looping movements of their caterpillars. All the species of *Thera* feed on Conifers; *T. juniperata* and *T. coniferata* on Juniper, *T. variata* and *T. firmata* on Scotch Fir. The insects are common in many parts of Britain, where their food-plants occur; but they seldom cause serious damage to either Junipers or Firs. The moths are all between ⅝in. and 1⅛in. in spread of wings, and are very much alike. In all, the wings are rather large in proportion to the slender body, and are grey or greyish-brown, with a broad darker band across the front wings. Both the species that feed on Juniper are about 1in., or a little less, across the wings. In *T. juniperata*, the front wings are pale grey, with a dark grey band, which is bounded on each side by a very zigzag line, and there is a dark streak close to the tip of the wing. *T. coniferata* has the front wings greyish-brown, with the lines bounding the cross-band much less zigzag. The insects

Juniper Moth—*continued.*

that live on the Fir are slightly larger. *T. firmata* has the front wings pale grey, with an indistinct ochreous-brown band; and *T. variata* has them greyish-brown, with the inner margin of the band not so straight as in *T. coniferata.* The caterpillars of all four species are green, marked with lemon-yellow or white lines (usually three) down the back and sides. The pupæ are usually green, and are inclosed in a silken cocoon, either suspended among the twigs of the food-plant, or among rubbish on the ground. *T. juniperata* flies in October; the other species appear from July to September. Should it be desirable to reduce their numbers, this may be done, in some degree, by shaking the branches, and by the removal of dead twigs, as well as of all rubbish from below the bushes.

JUNIPERUS (the old Latin name used by Virgil and Pliny). Juniper. ORD. *Coniferæ.* A genus of about twenty-seven species of hardy or nearly hardy evergreen trees or shrubs, natives of the temperate or cold regions of the Northern hemisphere. Flowers dicœcious; males in solitary or crowded catkins. Cones small, globose, baccate, of four to six decussate or whorled, confluent, fleshy scales. Fruit berry-like, ripening the second year. Leaves needle-shaped, linear or lanceolate, rigid or flexible, or scale-like, scattered or imbricated, not clustered. *J. communis*, the species most commonly grown, thrives in almost any position. On the sides of hills, the trunk grows long; while on the tops of rocky mountains, or in boggy land, the species becomes merely a tufted shrub. All the members of this genus may be readily propagated by seeds, which retain their vitality, when kept in the berry, for several years. When sown, they lie one year, and often two years, before they come up. Propagation may also be effected by cuttings, planted in sandy soil, in a shady situation, in the autumn, and covered with a hand glass during winter; or by layers.

J. bermudiana (Bermuda). Barbados or Bermuda Cedar. *l.* dimorphous, acicular, and arranged in threes on the young plants, but becoming scale-like and imbricated as the tree becomes aged. *h.* 40ft. to 50ft. Bermudas, 1683. A somewhat tender species, assuming a densely-branched pyramidal form in its native country. This tree furnishes the wood used in the manufacture of "cedar" pencils. It is very rarely seen in England. (G. C. n. s., xix. 657.)

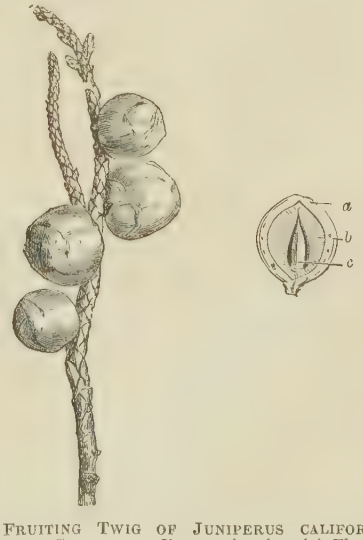


FIG. 351. FRUITING TWIG OF JUNIPERUS CALIFORNICA; also LONGITUDINAL SECTION OF FRUIT, showing (*a*) Fleshy Portion, (*b*) Seed, and (*c*) Embryo.

J. californica (Californian). *l.* ternate, short and thick, mostly acute. *fr.* reddish, dry and sweetish. Branches stout, spreading, with thick branchlets. Shrub, or sometimes a tree from 20ft. to 35ft. See Fig. 351.

Juniperus—*continued.*

J. chinensis (Chinese).* *l.* ternate or opposite, linear, flat, acute, and spreading, or small, scale-like, and closely imbricated. China, 1804. A very handsome shrub or tree, of erect or elongated pyramidal habit, with short branches and dimorphous foliage. The female and male plants are distinct, both in habit and aspect. The male is the more desirable, and is much more generally grown; it has numerous branches, the higher ones ascending, or nearly erect, and all very much ramified. The female plant has the branches longer, more distant, and more spreading, than those of the male; the small berries are of a brownish-violet colour. (S. Z. F. J. ii. 126, 127.) The varieties of this species are numerous.

J. c. albo-variegata (white-variegated). A pretty form, differing from the male type in having the foliage interspersed with silvery-white among the ordinary green growth, and in having many of the terminal shoots pure white. Japan.

J. c. aurea (golden). A very beautiful and distinct form, of garden origin, differing from the type in being suffused with bright gold, which it retains all the year round, and which is heightened by full exposure to the sun.

J. c. densata (dense). According to Messrs. R. Smith and Co., this is a female form, and has somewhat the appearance of the species, but the leaves are larger and more plentiful. The main stem grows upright, and all the branchlets, which are very numerous, are more or less pendulous. This variety forms a dense pyramidal growth, and is very ornamental. *h.* 10ft. to 20ft. Himalayas.

J. c. japonica (Japanese).* *l.* arranged in threes, close set, at first acicular, but ultimately scale-like, distinctly marked with two silvery glaucous lines above. Stem usually divided, but sometimes single. *h.* 2ft. Japan and North China. A small and compact-growing shrub, very desirable for rockwork.

J. c. j. aurea (golden). A very loose-growing form, having the growth of the current season tinged with golden-yellow, which gradually changes to light green. Primary branches few, robust, and comparatively long.

FIG. 352. JUNIPERUS COMMUNIS HIBERNICA, showing Habit, Fruiting Branchlet, and Young Female Cone.

Two other forms, described by Smith, are: *glauca* (glaucous), a very distinct form, having the foliage of a glaucous or bluish tint; and *Leeana* (Lee's), which has leaves about ½in. long, and forms a densely-branched and vigorous-growing shrub.

J. communis (common).* Common Juniper. *l.* subulate, rigid, sharp-pointed, spreading, and opposite, or in threes, usually glaucous above and green below. *h.* 3ft. to 20ft., varying according to the elevation at which it is found. Northern hemisphere (Britain). Well-grown specimens of this species, nicely furnished with branches, are most desirable plants. The wood is finely-veined, of a yellowish-brown colour, and has an aromatic scent. The varieties of it are, for the most part, well worth growing. The following call for special mention:

J. c. canadensis (Canadian). A dwarf spreading bush of inelegant habit, seldom exceeding 3ft. in height. Northern United States, &c., 1820.

J. c. compressa (compressed). A very compact-growing variety, having a conical form, and slender, erect branches and branchlets, which grow close together. *h.* 1ft. to 3ft. This is one of the smallest of Conifers; the very diminutive size of the plant rendering it interesting. It is found on the Pyrenees at a great elevation.

J. c. cracovia (Cracow). Polish Juniper. An erect, robust-growing variety, well-clothed with leaves, and sometimes having the terminal branchlets pendulous. *h.* 12ft. to 15ft. Poland.

J. c. fastigiata (pyramidal). Swedish Juniper. A more erect-growing form than the type, and somewhat resembling the Irish

Juniperus—*continued.*

Juniper, but more robust in growth, and with foliage more glaucous, and of a light green. In habit, it is either columnar or angular, and is not usually considered very ornamental. SYN. *J. c. suecica.*

J. c. hemisphærica (half globe-headed). *l.* short, rigid, needle-shaped, in threes, glaucous. South Europe. A curious and interesting little shrub, with a dense rounded habit. SYN. *J. echiniformis.*

J. c. hibernica (Irish).* Irish Juniper. A well-known and desirable variety, with a somewhat columnar habit of growth, and a peculiar silvery-glaucous appearance; the branches are erect, with numerous, rigid, close-set branchlets. It is the handsomest of all the varieties of *J. communis*, and thrives best on cool clay or peat soils. SYN. *J. stricta.* See Fig. 352. There is a form with prettily-variegated leaves.

J. c. nana (dwarf). A pretty dwarf procumbent shrub, with short branches and branchlets, covered with shorter, broader, imbricated, incurved leaves, glaucous above and green beneath. Alpine parts of Europe, &c. SYN. *J. nana.*

J. c. oblonga (oblong-fruited). A procumbent shrub, with slender branches and branchlets, clothed with long, attenuated leaves, which are of a deeper and brighter colour than the type. Caucasus. This variety rarely thrives well in England. It is very distinct as regards the colour of its foliage, and it sometimes takes an erect habit. SYN. *J. oblonga.*

J. c. suecica (Swedish). A synonym of *J. c. fastigiata.*

FIG. 353. FRUITING BRANCHLET OF JUNIPERUS DRUPACEA.

J. drupacea (drupe-fruited).* *l.* in threes, broader and stouter than those of any other species, very sharp-pointed, and light green. The fruits of this species are remarkable, both in size and colour; they are of deep purple, covered with a glaucous bloom, and are about the size of the common sloe. Branches numerous, short, imparting a columnar or elongated conical form to the tree. Trunk straight, erect. *h.* 8ft. to 10ft. Northern Syria, &c., 1854. This is a very handsome and distinct species, and is particularly ornamental as a plant for lawns. See Fig. 353.

J. dumosa (brambly). A synonym of *J. recurva squamata.*

J. echiniformis (hedgehog-like). A synonym of *J. communis hemisphærica.*

J. excelsa (tall).* *l.* opposite or (rarely) in threes, thick, decurrent, loosely imbricated, having a greyish-green hue. Branches short, much ramified. *h.* 20ft. to 40ft. Asia Minor, 1806. A compact-growing and very distinct ornamental tree, having a pyramidal shape; it is somewhat tender, but forms handsome specimens in sheltered situations. The varieties are not numerous.

J. e. stricta (upright).* This variety differs from the type principally in having a more tapering outline and more glaucous

Juniperus—*continued.*

foliage. It is an extremely pretty species, of garden origin, and well deserves cultivation.

J. Fortunei (Fortune's). A synonym of *J. sphærica.*

J. fragrans (fragrant). A synonym of *J. occidentalis.*

J. macrocarpa (large-fruited). A shrub of more open and spreading habit than the common Juniper; it has also longer leaves, and, as its name implies, bears larger berries. It is rarely other than an inelegant bush in British gardens. *h.* 10ft. to 12ft. Mediterranean region.

J. nana (dwarf). A synonym of *J. communis nana.*

J. neoboriensis (Naumberg). *l.* short, rigid, very glaucous. A very distinct species, with a pyramidal or fastigiate habit, and short branches; probably of garden origin. According to Messrs. Veitch, the Juniper cultivated in British gardens under this name is evidently a variety of *J. communis.*

J. nepalensis (Nepaul). A synonym of *J. recurva.*

J. oblonga (oblong). A synonym of *J. communis oblonga.*

J. occidentalis (Western).* *l.* in whorls of three; when young, spreading, sharp-pointed, glaucous; but when in an adult state, short, blunt, imbricated, and closely appressed to the stem. Berries small, deep purple, covered with a glaucous bloom. *h.* 10ft. to 50ft. California. A conical, erect-growing species, of a peculiar colour. When bruised, its branches emit a very strong scent. It is a very handsome plant for lawns. SYN. *J. fragrans.*

J. o. Burkei (Burke's). A desirable variety, of neat, compact habit, and of a more decided blue-glaucous tint than the type.

FIG. 354. JUNIPERUS SABINA, showing Habit and detached Portion of Branch.

J. oxycedrus (sharp-Cedar). *l.* sharp, spreading, needle-like, in whorls of three. *h.* 10ft. to 12ft. Spain, Portugal, &c., 1739. A large, bushy, much-branched shrub, with slender pendulous branches. This species may be distinguished from the common Juniper by its somewhat broader and shorter leaves, with more prominent white bands on the under side. In Great Britain, owing to climacteric causes, it attains but small proportions, has an inelegant habit, and is quite destitute of any ornamental qualities. SYN. *J. rufescens.*

J. pachyphlœa (thick-barked). *l.* subulate, almost squamiform, closely imbricated, thick and broad at the base, sharp-pointed. A slender, upright tree, with a whitish appearance, a tapering habit, and short, erect branches. New Mexico. A remarkable, but scarcely handsome species.

J. phœnicea (Phœnician).* *l.* small, scale-like, in threes, imbricated, scarcely glaucous. *h.* 15ft. to 18ft. Mediterranean region, 1683. A large pyramidal shrub, with a profusion of slender pendulous branches, growing in tufts. It is a handsome plant for growing near water, or on rockwork, in almost any situation.

J. p. lycia (Lycian). This form is described as being a creeping shrub. It is interesting, from producing the resinous gum known as Olibanum, which is used as incense in religious ceremonies on the Continent. (A. F. B. iv. 2367.)

J. procumbens (procumbent).* A glaucous creeping species, having a spreading habit, and never rising more than a few inches from the ground. It closely resembles *J. Sabina* in the colour of its foliage, but the young growth is more glaucescent. It is a very

Juniperus—*continued.*

ornamental plant for rockwork. Canada and Northern United States. SYNS. *J. prostrata* and *J. repens.*

J. prostrata (prostrate). A synonym of *J. procumbens.*

J. recurva (recurved). *l.* loosely imbricated, sharp-pointed, usually in whorls of three, greyish-green. Branchlets recurved, pendulous, feathery. *h.* 5ft. to 8ft. Nepaul, 1817. A graceful and handsome plant when healthy, but liable to attacks of Red Spider. It should be grown in a cool soil. The male form, usually called *densa*, is much shorter in foliage, and very much dwarfer in habit, than the female form. SYNS. *J. nepalensis* and *J. repanda.* (G. C. n. s., xix. 468.)

J. r. squamata (scaly-leaved). *l.* rigid, sharp-pointed, scaly, usually in threes, glaucescent. Branches with numerous short stiff branchlets. A large creeping shrub, with a much-branching and spreading habit, and rather more peculiar than ornamental. *h.* 3ft. Nepaul, 1824. SYN. *J. dumosa.*

J. repanda (repand). A synonym of *J. recurva.*

J. repens (creeping). A synonym of *J. procumbens.*

J. rigida (stiff-leaved). *l.* very distinct, about ½in. long, linear, rigid, erect, sharp-pointed, produced in whorls of three, marked with a glaucous furrow on the upper side. Branches drooping; when young, slender, and of a lively green, slightly tinged with yellow. *h.* 15ft. Japan, 1861. An ornamental species, with an upright and somewhat irregular habit. (S. Z. F. J. ii. 125.)

J. rufescens (reddish-berried). A synonym of *J. oxycedrus.*

J. Sabina.* Common Savin. *l.* small, scale-like, imbricated, somewhat acute. *h.* 5ft. to 8ft. South Europe, 1548. An ornamental much-branched shrub, having a spreading, irregular habit, and with numerous reclinate or trailing branches. It thrives best in a light soil, and in airy situations. See Fig. 354.

J. S. tamariscifolia (Tamarisk-leaved).* A very ornamental low-growing, densely-branched, and trailing species. It has a neater habit than the type, and its foliage is of a brighter green. An excellent plant for rockwork, banks, &c. This variety is sometimes known as the Carpet Juniper. SYN. *J. sabinoides.* (Enc. T. & S. 2022.)

J. S. variegata (variegated). A very distinct and pretty variegated form, having its branchlets creamy-white or pale yellow. It should not be grown in too sunny a position.

J. sabinoides (Sabina-like). A synonym of *J. Sabina tamariscifolia.*

J. Sheppardi glauca (Sheppard's glaucous). A synonym of *J. sphærica Sheppardi.*

J. sphærica (globular-fruited). *l.* scale-like, imbricated. Berries of a globular or spherical form. North China, 1846. This species "combines the upright mode of growth of *J. chinensis* with the habit of *J. phœnicea* in its much-divided tufted branches and scale-like leaves; the colour of the foliage being, on the whole, brighter than the latter, and less glaucescent than the former. It shows the same peculiarity as *J. phœnicea*, in often departing from the dicecious character of the Juniper, so that particular branches are sometimes found loaded with berries, while the remainder of the plant has none" (Veitch's "Manual of the Coniferæ"). SYN. *J. Fortunei.*

J. s. Sheppardi (Sheppard's). *l.* acicular, rigid, not imbricated, sharp-pointed, assuming in autumn, and with the young growth, a very glaucous or almost silvery whiteness. It is a very pretty shrub, and has a rather spreading habit. China. SYN. *J. Sheppardi glauca.*

J. stricta (upright). A synonym of *J. communis hibernica.*

J. thurifera (incense-bearing).* Frankincense Juniper. *l.* subulate, imbricated, in opposite pairs, light glaucous green. Branches slender, numerous, much divided, densely clothed with leaves. *h.* 15ft. to 25ft. South-west Europe, 1752. (A. F. B. iv. 2369.) A very ornamental, small, pyramidal tree, with an erect, slender, tapering trunk.

J. virginiana (Virginian).* Red Cedar. *l.* usually subulate and spreading in young plants, and very minute, scale-like, and closely imbricated. Branches at first erect, but ultimately usually decumbent, having numerous crowded branchlets. Trunk erect, of varying shades. *h.* 10ft. to 15ft.; towards its Western limits, often a large tree, 60ft. to 90ft. high. United States, 1664. A well-known ornamental tree, usually of pyramidal form, and having beautiful bright red heart-wood. Its timber has an aromatic fragrance, and is largely employed in the manufacture of various utensils in its native country. The varieties of this species are somewhat numerous.

J. v. alba variegata (white-variegated). A form having a portion of the leaves white, and the remainder of greenish-yellow.

J. v. aurea-variegata (golden-variegated). A variable form, sometimes having the terminal branches and branchlets deep yellow, while at others the variegation is but a spot. It should be grown in a shady situation.

J. v. Bedfordiana (Bedford's). A handsome form, having the branches longer and more slender than the type; ultimate branches filiform, pendulous.

J. v. dumosa (bushy). A dwarf form, having a roundish, spreading, compact head. It resembles *J. Sabina tamariscifolia.*

Juniperus—*continued.*

J. v. elegans (elegant). A handsome free-growing variety, the entire plant being suffused with cream-coloured spots, which it retains throughout the winter and summer.

J. v. glauca (silvery). Silver Cedar. A very handsome variety, having a whitish appearance when making growth. It has a pretty cone-shaped habit, and is thickly branched from the ground upwards.

J. v. humilis (dwarf). A distinct and attractive variety, having the shoots branching out in a remarkable angular form.

J. v. pendula (pendulous). Weeping Red Cedar. "According to Gordon ("Pinetum"), "there are three forms of the pendulous Red Cedar to be found in collections; one of the male form, another the female, and the third a *bright green* one. The male kind has shorter and much more numerous branchlets, while the female one has longer, more slender, and much fewer branchlets; the third variety is of a light glossy green." The female form is superior to the others.

J. v. Schotti (Schott's). A distinct variety, of pyramidal habit, and distinguished by its peculiar light green foliage.

J. v. tripartita (three-parted). A very pretty dwarf spreading variety, somewhat resembling *J. Sabina* in habit, but much denser.

JUPITER'S BEARD. *See* **Anthyllis Barba-Jovis.**

JURINEA (derivation not explained). ORD. *Compositæ.* A genus containing about forty species of hardy herbaceous perennials, natives of South Europe, Western and Central Asia, and distinguished from allied genera in the four-sided, somewhat top-shaped achenes being crowned with a pappus of unequal rough hairs. None of the species introduced are of much horticultural value, although occasionally seen in gardens. They thrive in any ordinary garden soil. Increased by seeds, or by divisions of the roots, in spring.

J. depressa (depressed). *fl.-heads* purple. June. *l.* stalked, lyrate, pale green above, canescent beneath; the terminal segment large, rounded; the lateral ones small, ovate or triangular, entire. *h.* 6in. Caucasus, 1837.

J. spectabilis (showy). *fl.-heads* purple. June. *l.* pinnatifid; lobes oblong, obtuse, angulate, white-tomentose underneath. *h.* 1ft. Caucasus, 1837.

JUSSIÆA (named in honour of the celebrated family of Jussieu). SYN. *Jussieua.* ORD. *Onagrarieæ.* A genus comprising about thirty species of stove or greenhouse herbs, or rarely shrubs, very rarely small trees, often marsh-loving, and a few aquatic; they extend over the tropical regions of the globe, but are mostly found in America. Flowers white or yellow, axillary, solitary, very short or long-stalked; calyx with an elongated tube, and four to six persistent lobes; petals four to six, spreading. Leaves alternate, very frequently membranaceous and entire, rarely coriaceous and serrated. All the species thrive in a loamy soil, the aquatics requiring a basin of water. Propagation may be effected either by seeds or by divisions.

J. frutescens (shrubby). *fl.* yellow, shortly pedicellate; calyx lobes four, ovate, acute, pubescent outside; tube cylindrical, eight-furrowed. June. *l.* sessile, lanceolate-linear, glandulose, slightly crenate. 1824. Stove evergreen shrub.

J. ovalifolia (oval-leaved). *fl.* sessile; calyx lobes four, ovate, acuminate, three-nerved; petals orbiculate, nearly equal; tube elongated, tetragonal. *l.* sub-sessile, elliptic, acuminate, nerve-veined. Madagascar. (B. M. 2530.)

J. repens grandiflora (creeping, large-flowered). *fl.* yellow, 2in. in diameter, drooping before expansion; petals twice as long as the five calyx segments. May to August. *l.* lanceolate, acute. Stem creeping at base, 2ft. to 3ft. long. North America (in marshes), 1812. Greenhouse herb. (B. M. 2122.)

JUSSIEUA. A synonym of **Jussiæa** (which *see*).

JUSTICIA (named after J. Justice, a Scotch horticulturist). SYNS. *Adhatoda* (in part), *Athlianthus*, and *Tyloglossa.* ORD. *Acanthaceæ.* A large and much-confused genus, comprising about 100 species of herbs and sub-shrubs, occurring in tropical and sub-tropical regions, chiefly in India and Southern Africa. Flowers white, violet, pink, or rarely red. Leaves entire. Justicias are mostly of easy culture, and thrive in a compost of about equal parts of loam and leaf soil. Propagated by cuttings, inserted preferably in single pots, in spring, and placed in a close, warm frame. Young plants should be pinched, to encourage a bushy growth. They may be cultivated in frames all the summer, but require a stove or warm greenhouse temperature in winter.

Justicia—*continued.*

J. callitricha. *See* **Schaueria flavicoma.**

J. calycotricha. *See* **Schaueria flavicoma.**

J. calytricha. *See* **Schaueria calycotricha.**

J. flavicoma. *See* **Schaueria flavicoma.**

J. Gendarussa (Gendarussa). *fl.* lilac, whorled; spikes terminal, leafy. June and July. *l.* elongated. *h.* 3ft. India, 1800. (B. R. 635.)

J. Lindeni. *See* **Jacobinia Lindeni.**

J. marmorata (marbled).* *l.* light shining green, blotched and marbled with white, about 10in. long and 4in. broad. A distinct and useful decorative plant.

J. pedunculosa. *See* **Dianthera americana.**

J. peruviana (Peruvian).* *fl.* pale violet, large, in clusters in the axils; lower lip veined white. Autumn. *l.* opposite, on footstalks, ovate-lanceolate, veiny, smooth beneath, hairy above. Stem 2½ft. high, pubescent, branched. Peru. (B. M. 430.)

J. secunda. *See* **Dianthera secunda.**

J. speciosa. *See* **Peristrophe speciosa.**

J. ventricosa (swollen).* *fl.* pink; spikes terminal; corolla tube a little swollen upwards. June and July. *l.* oblong-ovate, entire, glabrous. *h.* 3ft. India and China, 1826. (B. M. 2766.)

KADSURA (its Japanese name). SYN. *Sarcocarpon.* ORD. *Magnoliaceæ.* A genus comprising about seven species of half-hardy climbing shrubs, natives of the mountains of Eastern tropical Asia. Flowers whitish or reddish, axillary or solitary. Leaves coriaceous, rarely membranaceous. Only one species is in general cultivation; it thrives in almost any soil, if grown against a wall. Cuttings of nearly ripened shoots will root in sand, under a bell glass.

K. japonica (Japanese). *fl.* white; peduncles opposite the leaves, one-flowered, usually solitary, longer than the petioles. June to September. *l.* oval or oblong-oval, acute at both ends, serrated, smooth, thick. Japan, 1846. Half-hardy shrub. (S. Z. F. J. 17.) There is a very pretty variegated form of this species.

KÆMPFERIA (named after E. Kæmpfer, 1651-1716, a German naturalist). Including *Cienkowskia* and *Monolophus.* ORD. *Scitamineæ.* A genus comprising about eighteen species of ornamental stove herbaceous perennials, natives of tropical Africa and Asia. Flower-spikes on leafy stems, or on radical, scaly, terminal scapes; corolla tube elongated, exserted; lobes lanceolate, acute, equal, spreading or reflexed. Leaves small, or rather large, generally elliptic or ovate-lanceolate, acuminate. Kæmpferias thrive in well-drained fibry loam and peat. During the growing season, they require an abundant supply of water; but when the leaves turn yellow, this should be almost entirely withheld, and the pots stowed away under staging, where no drip can reach them. When growth recommences, the plants should be shaken out and repotted.

K. Galanga (Galangale). *fl.* white, purple; external laciniæ of corolla lanceolate-linear; lower inner lacinia divided into two obovate segments. August. *l.* ovate, sessile. *h.* 1ft. Cochin China, 1728. (B. M. 850.)

K. Gilbertii (Gilbert's).* *l.* tufted, oblong-lanceolate, deep green; margin slightly undulated, and bordered by a broad and very conspicuous band of white. Moulmein, 1882. A very attractive and desirable variegated plant. See Fig. 355, for which we are indebted to Mr. Wm. Bull. (G. C. n. s., xvii. 713.)

K. ornata (adorned).* *fl.* yellow; disk orange. Summer. *l.* long-stalked, acute-lanceolate, shining deep green above with a broad silvery central band, purple beneath. Borneo, 1883. A handsome foliage plant. (I. H. 1884, 159.)

K. Parishii (Parish's). *fl.* white, bright violet-purple. July. *l.* lanceolate, erect, pale green. *h.* 1ft. Moulmein, 1867. (B. M. 5763.)

K. Roscoeana (Roscoe's). *fl.* white, few, fascicled, erect, sessile; segments obovate-obtuse. October. *l.* sub-orbiculate, acute, variegated above. *h.* 6in. Burmah, 1827. Plant stemless. (B. M. 5600.)

K. rotunda (round). *fl.* white, reddish-violet, large, fragrant. July to August. *l.* oblong, coloured beneath. *h.* 1ft. India, 1764. (B. M. 920, 6054.)

KAGENECKIA (named after Frederick de Kageneck, an ambassador from Holland to Spain). ORD. *Rosaceæ*. A genus of three or four species of half-hardy evergreen trees, natives of Chili and Peru. Flowers unisexual, terminal, racemose or corymbose, solitary. Leaves scattered, petiolate, serrated, thick, coriaceous; stipules small. The species thrive in a compost of loam, peat, and sand. Ripened cuttings will root, in sand, under a bell glass.

Kageneckia—*continued.*

K. cratægoides (Hawthorn-like). *fl.* white, in axillary racemes. June. *l.* oval-lanceolate, smooth, glaucous. *h.* 10ft. Chili, 1830. (B. R. 1836.)

K. oblonga (oblong). *fl.* white, solitary. August to December. *l.* oblong, obtuse, coriaceous, serrulated. *h.* 30ft. Chili, 1830.

FIG. 355. KÆMPFERIA GILBERTII.

KALANCHOE (Chinese name of one of the species). SYNS. *Calanchoe, Vereia.* ORD. *Crassulaceæ*. A genus of about a score species of erect, robust, stove or greenhouse herbs or shrubs, natives of tropical Asia, tropical and

Kalanchoe—*continued.*

Southern Africa, and one from Brazil. Flowers yellow, purple, or scarlet, rather large, numerously disposed in paniculate cymes; corolla salver-shaped; tube urceolate; limb four partite, spreading. Leaves fleshy, opposite, sessile or petiolate, toothed, serrated, or entire. For culture, &c., *see* **Crassula.**

K. crenata (crenate-leaved). *fl.* yellow, in very long loose spikes. Autumn. *l.* oblong-lanceolate, broadly toothed, crenated; crenatures usually double. *h.* 1ft. to 2ft. Sierra Leone, 1793. Stove shrub. (B. M. 1436, under name of *Cotyledon crenata.*)

K. farinacea (floury). *fl.* scarlet, in compact umbel-like heads. Summer. *l.* round-spathulate, entire, sessile. *h.* 6in. to 12in. Socotra, 1882. A handsome stove succulent decorative plant. (R. G. 1143.)

K. grandiflora (large-flowered). *fl.* rather large; corolla bright yellow, hypocrateriform; tube elongated, bottle-shaped; limb of four reflexed sepals; cyme terminal, sub-sessile, many-flowered. May. *l.* succulent, glaucous, 2in. to 3in. long, opposite, sessile, ovate or sub-rhomboidal, becoming gradually smaller up the stem; margins coarsely sinuato-crenate. Stem succulent. *h.* 2ft. India, 1863. Greenhouse. (B. M. 5460.)

KALE. *See* **Borecole.**

KALMIA (named in honour of Peter Kalm, 1715-1799, a pupil of Linnæus, who travelled in Canada and the Northern States, and became Professor at Abo). American Laurel. ORD. *Ericaceæ.* A genus comprising six species of ornamental hardy evergreen shrubs, of which one is from Cuba, and the rest from North America, extending from Florida to California and the Arctic regions. Flowers rose-coloured, purple, or white, showy, clustered or rarely scattered; bracts ovate to subulate, coriaceous, or firm and persistent; corolla broadly campanulate or sub-hypocrateriform. Leaves entire. Kalmias thrive under treatment similar to Rhododendrons and such-like plants, in a peaty soil, where the roots are provided with ample moisture. The best-known and most-grown species is *K. latifolia.* It is well adapted for forcing, in spring, for greenhouse or conservatory decoration. For this purpose, the plants should be potted up during winter, after the blossoms have well set. Propagated by cuttings of young shoots, inserted in sandy peat, and placed in a shady situation, under a hand glass; or by seeds, sown in shallow pans of sandy peat, and kept in a cold frame until the seedlings are large enough to handle, when they may be gradually hardened off, and transferred to the open air.

K. angustifolia (narrow-leaved).* *fl.* purple or crimson, not half so large as those of *K. latifolia,* disposed in lateral corymbs. Early summer. *l.* mostly in pairs or threes, oblong, obtuse, 1in. to 2in. long, petioled, light green above, dull or pale beneath. *h.* 2ft. to 3ft. Canada, 1736. A very pretty species. (B. M. 331.) There are several varieties, differing chiefly in the size of parts, and in the deeper and lighter shade of the corolla. The dwarf one, known as *nana,* is especially worth mention.

K. cuneata (wedge-shape-leaved). *fl.*, corolla white or whitish, ½in. in diameter; inflorescence lateral, nearly glabrous. May and June. *l.* oblong, with cuneate base, 1in. long, almost sessile, and chiefly alternate, mucronate. *h.* 2ft. North and South Carolina, 1820. A low, somewhat pubescent shrub.

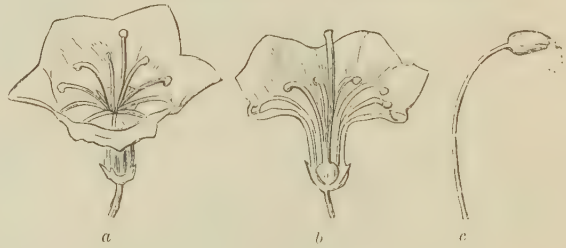
K. glauca (glaucous).* *fl.* lilac-purple, ½in. to ¾in. in diameter; bracts large; sepals ovate, scarious-coriaceous, much imbricated. Spring. *l.* opposite, or rarely in threes, almost sessile, oblong or linear-oblong, or appearing narrower by the usual strong revolution of the edges, 1in. or less long, glaucous-white beneath. *h.* 1ft. to 2ft. 1767. (B. M. 177.)

K. hirsuta (hairy). *fl.* scattered and axillary, on pedicels longer than the leaves; corolla rose-purple, barely ½in. in diameter; sepals ovate-lanceolate, leaflike, as long as the corolla, at length deciduous, leaving the old capsules bare. Summer. *l.* nearly sessile, plane-oblong or lanceolate, ½in. to ¾in. long. *h.* 1ft. South-east Virginia to Florida, 1786. A free-branching shrub. (B. M. 138.)

K. latifolia (broad-leaved).* Calico Bush. *fl.*, inflorescence very viscid-pubescent; corolla rose-colour to white, ¾in. in diameter; fascicles numerous, crowded in compound terminal corymbs. Summer. *l.* alternate, or occasionally somewhat in pairs or threes, oblong or elliptical-lanceolate, acutish at both ends, petioled, bright green. *h.* 3ft. to 10ft. (in the South Alleghanies, sometimes 20ft.) Mountainous districts of Canada, Western Florida, &c., 1734. One of the most useful, elegant, and attractive of dwarf flowering shrubs. It is a slow-growing subject, but is

Kalmia—*continued.*

FIG. 356. FLOWERING BRANCH OF KALMIA LATIFOLIA.



a *b* *c*

FIG. 357. KALMIA LATIFOLIA, showing (*a*) detached Flower; (*b*) Section of ditto; and (*c*) Stamen.

generally of very easy culture. For cutting purposes it is also useful, if a corymb of flowers is taken with a good stem and a few leaves; but the blossoms can be seen nowhere to more advantage than on the bush. See Figs. 356 and 357. (B. M. 175.)

KALOSANTHES. A synonym of *Rochea.* Some of the plants formerly included under *Rochea* are now placed under **Crassula** (which *see*).

KARATAS (derivation of name uncertain). SYNS. *Nidularium, Regelia* (of Lemaire). ORD. *Bromeliaceæ.* A genus comprising about ten species of stove herbaceous perennials, natives of the West Indies, tropical South America, and several from Brazil. Flowers in dense, sessile, terminal heads. Leaves rosulate, often very long, spinoso-serrate. For culture, *see* **Billbergia.**

K. cruenta (bloody). *fl.* blue, red; spike capitate, sub-sessile. February to March. *l.* strap-shaped, obtuse, mucronate, spinosely dentate, tipped with blood-red; bracts broad-oval, imbricate, obtuse, concave. *h.* 1ft. Rio Janeiro, 1824. (B. M. 2892, under name of *Billbergia cruenta.*)

K. humilis (dwarf). *fl.* crimson, in central depressed tufts, surrounded by leaves. *l.* recurved, lanceolate, strongly toothed; lower ones greyish, mealy. *h.* 1ft. West Indies, 1789. See Fig. 358. (R. H. 1878, 190.)

K. Innocentii (Innocent's). *fl.* bright orange-red, produced in a nest-like crown. *l.* large, lanceolate, dark green on the upper side, deep reddish-purple beneath; margins serrated. Brazil, 1862. A handsome and compact plant. (I. H. 1862, 329.)

K. Laurentii (Laurent's). *fl.* pale blue, in short heads. *l.* ligulate, recurved, abruptly acuminate, light green, dotted with dark brown; inner ones white towards the base. South America, 1867. An elegant plant. (R. G. 529.)

K. Legrellæ (Legrell's). *fl.* purple, white; bracts rose. *l.* 5ft. to 6ft. long, rigid, beset with curved spines, deep green above, subglaucous beneath. North Brazil, 1872. A noble species, the inflorescence of which is very handsome. (B. H. 1872, 129.)

K. olens (putrid-smelling). *fl.* purple, almost concealed by the closely-imbricating, broad, greenish-white bracts. *l.*, floral ones rich deep red; lower leaves full green, glabrous, about 1ft. long,

Karatas—*continued.*

1in. or more wide, spinulose-serrate at margin. *h.* 1ft. (B. M. 5502, under name of *Billbergia olens.*)

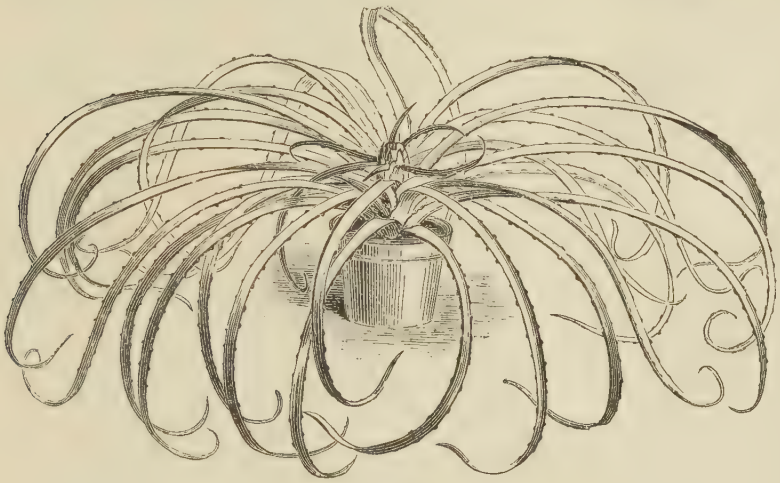


FIG. 358. KARATAS HUMILIS.

K. Plumieri (Plumier's). *fl.* pink, sessile, aggregate. *fr.* oval, 200 to 300 in number, sessile in a heap or central group, surrounded by paleaceous expanded leaves or bracts, and containing a succulent whitish or yellowish flesh under a coriaceous and yellowish bark. *l.* 6ft. to 7ft. long, radical, subulate-linear, sharp-pointed, spiny-edged. *h.* 2ft. West Indies, 1739. SYNS. *Bromelia Karatas* and *B. sceptrum.*

FIG. 359. KARATAS SCHEREMETIEWI.

K. Scheremetiewi (Scheremetiew's). *fl.* white, blue. *l.* green; floral ones bright red, much shorter than the outer ordinary leaves. *h.* 6in. to 12in. Probably Brazil. SYNS. *Caraguata serrata, Nidularium Scheremetiewi.* See Fig. 359. (R. H. 1875, 230.)

K. spectabilis (showy). *fl.* blood-red, white, pale violet-blue, in a crowded, terminal, flat-topped fascicle. *l.* about 1ft. long by 1½in. to 2in. broad, broadly strap-shaped, from a broad sheathing base, slightly concave; margin with small, remote, spiny teeth; upper surface dark green, except the tip, which presents a bright, blood-red patch ½in. deep on both surfaces; under surface covered with alternate transverse bands of dull green or purplish and dirty white. *h.* 1ft. Brazil. (B. M. 6024, under name of *Nidularium spectabile.*)

KARELINIA. Now included under **Pluchea** (which *see*).

KAULFUSSIA (named after Dr. G. F. Kaulfuss, a Professor of Botany at Halle, who died in 1830). ORD. *Filices.* A curious and very variable stove fern. Sori composed of from ten to fifteen sessile sporangia, arranged in concrete raised circular masses, hollow in the centre. For culture, *see* **Ferns.**

Kaulfussia—*continued.*

K. æsculifolia (Chestnut-leaved). *sti.* 1ft. to 1½ft. long, auricled at the base. *fronds* ternate or quinate-digitate; the central pinnæ the largest, oblong-spathulate, 6in to 12in. long, 3in. to 4in. broad, edge subentire; others similar but smaller. *sori* copious, scattered. Assam, Malay Islands, &c. The frond is like a Chestnut leaf, and the under surface is dotted over with copious stomata-like pores.

The plant usually known as *Kaulfussia amelloides* is **Charieis heterophylla** (which *see*).

KAURI PINE. *See* **Dammara australis.**

KEELED. Shaped like the keel of a boat; that is to say, with a sharp projecting ridge, arising from a flat or concave central plate; *e.g.*, the leaves of sedges, and of many Liliaceous plants.

KEFERSTEINIA. Now included under **Zygopetalum** (which *see*).

KELLETTIA. A synonym of **Prockia** (which *see*).

KELP. The mineral residue or ash obtained by burning different kinds of seaweed. It was formerly of great commercial value and importance, as the source of the carbonate of soda used in glass and soap making, &c. From the quantity of potash which Kelp contains (17·5 per cent.), and the importance of this as an ingredient of soils, its value is at once apparent. It has been applied, with more or less success, to crops of Potatoes, Broccoli, Cabbage, &c.

KENNEDYA (named after an English nurseryman). Including *Zichya.* ORD. *Leguminosæ.* A genus of eleven species of twining or prostrate, greenhouse perennials, from Australia. Flowers red or nearly black, on axillary peduncles, racemose, sub-umbellate or solitary. Legumes linear, compressed. Leaves pinnate, trifoliolate, rarely one or five-foliolate, stipellate; stipules broad, striated, sometimes very broad and connate. Kennedyas are fast-growing plants, well adapted for training up greenhouse pillars or rafters. They may be readily propagated from seeds, which are usually produced in great abundance, and may be sown in spring or summer; or from cuttings of rather firm side shoots, inserted at the same season, in peaty soil, and placed in a close, warm frame. Kennedyas may be grown in pots and trained over trellises if desired, but they succeed better when planted out, in a greenhouse, in a compost of peat and loam. Plenty of water should be given in spring and summer, but not much will be necessary in winter, when the plants are at rest. An ordinary greenhouse temperature will be sufficiently high. Insects, especially Scale and Mealy Bug, are frequently very troublesome, and as the numerous growths become so much entwined, it is difficult to effect a clearance. Taking the whole plant down, and thoroughly cleansing it with an insecticide before being replaced, is the best plan. An occasional syringing with petroleum and water proves a good preventive against the attacks of Bug. *K. prostrata Marryattæ* is one of the best of greenhouse twining plants, and, as its leaves and stems are downy, it is seldom attacked by insects of any description.

K. coccinea (scarlet). *fl.* scarlet; peduncles bearing three to nine flowers, in an umbellate head. May to August. *l.* having three obovate leaflets; stipules lanceolate, spreading. 1803. SYN. *K. inophylla.*

K. Comptoniana. *See* **Hardenbergia Comptoniana.**

K. cordata. *See* **Hardenbergia monophylla.**

K. eximia (choice). *fl.* scarlet, two, three, or more together in an umbel or very short raceme. *l.*, leaflets three, ovate or obovate, very obtuse. Plant prostrate or twining. (P. M. B. xvi. 35.)

K. glabrata (glabrous). *fl.* scarlet, several together in a small umbel, on axillary peduncles. *l.*, leaflets three, cuneate or

Kennedya—*continued.*

obovate-truncate, mucronate; stipules broad, veined. A slender, twining, glabrous species. (B. M. 3956; B. R. 1838.)

K. inophylla (nerve-leaved). A synonym of *K. coccinea.*

K. longiracemosa. *See* **Hardenbergia monophylla.**

K. macrophylla. *See* **Hardenbergia Comptoniana.**

K. monophylla. *See* **Hardenbergia monophylla.**

K. nigricans (blackish). *fl.* deep violet-purple, almost black, with a large, greenish-yellow blotch on the standard. March. *l.*, leaflets broadly ovate or rhomboidal, obtuse or emarginate; stipules small, striate, reflexed. 1832. A large twining species. (B. M. 3562; B. R. 1715.)

K. ovata. *See* **Hardenbergia monophylla.**

K. prostrata (prostrate).* *fl.* scarlet; peduncles one or two-flowered. March to June. *l.*, leaflets 3½in. long, ovate, broadly ovate or orbicular, pubescent or hirsute; stipules broadly cordate, acute or acuminate. 1790. SYN. *Glycine coccinea* (under which name it is figured in B. M. 270).

K. p. Marryattæ (Mrs. Marryatt's).* *fl.* light scarlet; peduncles four-flowered. March to June. *l.*, leaflets three, oblong, obtuse, undulated; stipules and bracts cordate. 1834. A free-growing twining plant, and, perhaps, the best of all the Kennedyas.

K. rubicunda (reddish).* *fl.* of a dull or dark red, in pedunculate racemes rarely exceeding the leaves. May. *l.*, leaflets three, usually ovate, but varying from broadly-rhomboid obovate or almost orbicular, to ovate-lanceolate or lanceolate and acute. 1788. A large twining species. (B. M. 268, under name of *Glycine rubicunda.*)

K. Stirlingii (Stirling's). *fl.* scarlet, on axillary peduncles. May. *l.*, leaflets three, ovate-orbicular, very obtuse, usually above 1in. long; stipules broadly cordate, usually large and much veined. 1834. Plant trailing or twining. (B. R. 1845.)

KENTIA (named in honour of Lieut.-Col. Kent). ORD. *Palmæ.* A genus comprising six species of ornamental stove palms, natives of New Guinea and the Moluccas, allied to *Areca.* Flowers on branched spikes. Leaves terminal, equally pinnatisect; segments sub-opposite, linear-lanceolate, acuminate or bidentate. Perhaps only a couple of species now retained in the genus are in cultivation, and these thrive in a compost of loam and peat, in equal proportions, to which may be added a little silver sand. They require plenty of pot room, and copious supplies of water throughout the summer, both at the roots and overhead. When attacked by Red Spider or Thrips, the plants must be sponged with soapy water. Propagated by imported seeds, which quickly germinate in a light sandy soil, if placed on a hotbed.

K. Baueri. *See* **Rhopalostylis Baueri.**

K. Belmoreana. *See* **Howea Belmoreana.**

K. Canterburyana. *See* **Hedyscepe Canterburyana.**

K. costata (ribbed). *l.* regularly pinnatisect, with very numerous linear-lanceolate acuminate segments, in old plants about 10ft. long and 3ft. wide. Stems 80ft. to 90ft. high. Spadix branched, with erect, fastigiate branches. Aru, &c.

K. Forsteriana. *See* **Howea Forsteriana.**

K. gracilis (of Lindley). *See* **Kentiopsis divaricata.**

K. Joannis. *See* **Veitchia Joannis.**

K. Lindeni. *See* **Kentiopsis macrocarpa.**

K. Macarthurii. *See* **Ptychosperma Macarthurii.**

K. robusta. *See* **Cyphosperma Viellardii.**

K. sapida. *See* **Rhopalostylis sapida.**

K. Storckii. *See* **Veitchia Storckii.**

K. Viellardii. *See* **Cyphosperma Viellardii.**

K. Wendlandiana. *See* **Hydriastele Wendlandiana.**

KENTIA, of Steudel. A synonym of **Fagræa** (which *see*).

KENTIOPSIS (from *Kentia,* and *opsis,* resemblance; on account of its likeness to *Kentia*). ORD. *Palmæ.* A genus containing three species of stove palms, closely allied to **Kentia** (which *see* for culture).

K. divaricata (divaricate). *l.* pinnate; leaflets leathery, alternate, when young a fine red colour. *h.* 30ft. New Caledonia, 1876. SYN. *Kentia gracilis.* (I. H. n. s. 409.)

K. macrocarpa (large-fruited). *l.* pinnate, ovate in outline when young; pinnæ somewhat distant, oblong-lanceolate; petioles red. Young leaves deep olive-crimson. Stem stout, smooth. New Caledonia, 1876. A handsome species, of vigorous habit. SYN. *Kentia Lindeni.*

KENTROPHYLLUM (from *kentron,* a spine, and *phyllon,* a leaf). ORD. *Compositæ.* This genus is now included, by the authors of "Genera Plantarum," under *Carthamus.* Flower-heads surrounded by a number of prickly leafy scales. *K. arborescens,* being a half-hardy evergreen shrubby species, requires winter protection, and may be increased, during the spring, by striking cuttings of the young shoots under a handlight.

K. arborescens (tree-like). *fl.-heads* yellow. August. *l.* bright green, elongate, lanceolate, amplexicaul, with sinuate spinose-dentate margins. *h.* 6ft. Spain, 1731. (B. M. 3302.)

KENTUCKY COFFEE-TREE. *See* **Gymnocladus canadensis.**

KEPPLERIA. A synonym of **Oncosperma** (which *see*).

KERAMANTHUS (from *keramos,* a jar, and *anthos,* a flower; in allusion to the form of the calyx). ORD. *Passifloreæ.* A stove herbaceous perennial, of more botanical than horticultural interest. It requires to be kept rather dry during the season of rest.

K. Kirkii (Kirk's). *fl.* greenish, tubular. *l.* large, ovate, pubescent. *h.* 2ft. Zanzibar, 1875. (B. M. 6271.)

KERMES OAK. *See* **Quercus coccifera.**

KERRIA (named after M. Kerr, sometime Superintendent of the Botanic Garden in Ceylon). ORD. *Rosaceæ.* A genus (one or two species) of slender-branched, twiggy shrubs. *K. japonica,* the only species known to cultivation, is a handsome, erect, hardy, deciduous plant. It thrives in any good loamy soil. Increased by cuttings of the young shoots, inserted under a handlight; by layers; or by divisions of the plants. The sort most generally seen in cultivation is that with double blossoms; the single-flowered form is a much more elegant plant, having a very graceful habit, and being nearly always in flower.

FIG. 360. FLOWERING BRANCHLET OF KERRIA JAPONICA FLORE-PLENO.

K. japonica (Japanese).* *fl.* orange-yellow, solitary, terminal; peduncles scarcely ½in. long, glabrous; petals five, oblong-elliptical, obtuse, spreading. *l.* alternate, ovate-lanceolate, sharply and doubly serrated, conduplicate, stalked, 1in. to 1½in. long, ½in.

Kerria—*continued.*

to 1in. wide, bright green, shining, and almost glabrous above, paler and slightly hairy beneath. *h.* 3ft. to 4ft. Japan, 1700. (B. R. 1873; S. B. F. G. ser. ii. 337.) In addition to the single and double-flowered (see Fig. 360) sorts, there is a very pretty form, having the leaves variegated with sea-green, creamy-white, and pure white.

KETELEERIA. Included under *Abies.*

KIDNEY BEAN. *See* **Beans.**

KIDNEY-SHAPED. Crescent-shaped, with the ends rounded.

KIDNEY VETCH. *See* **Anthyllis.**

KIELMEYERA (named after K. F. Kielmeyer, of Wurtemberg, 1765-1844, a writer on botany). SYN. *Martinieria.* ORD. *Ternströmiaceæ.* A genus comprising about fifteen species of stove evergreen trees or shrubs, full of resinous juice, natives of Brazil. Flowers showy, terminal, disposed in racemes or short panicles, or rarely solitary; petals five-twisted. Leaves evergreen, often petiolate. Only one species has been introduced. It thrives in a fibry, sandy loam. Cuttings of young shoots will root in sand, under a bell glass, in heat.

K. excelsa (tall). *fl.* white; petals obovate, smooth, disposed in racemes. June. *l.* oblong, sub-elliptic, obtuse, quite smooth. *h.* 60ft. 1833. Tree.

KINGIA (named after Captain P. G. King, Governor of New South Wales). ORD. *Juncæ.* A monotypic genus, the species being a long-lived greenhouse plant, with an erect wooden caudex. For culture, *see* **Xanthorrhæa.**

K. australis (Southern). *fl.* arranged in a globular head, about 2in. in diameter; perianth segments lanceolate; peduncles several from the tuft of leaves, 6in. to 12in. long, covered with broad sheathing bracts. *l.* 2ft. to 3ft. long, and only one to two lines broad, in the greater part of their length, spreading or recurved, flat, or more or less triquetrous; edges usually serrulate. Caudex sometimes many feet in height. West Australia.

KING PLANT. *See* **Ancectochilus setaceus.**

KIRGANELIA. This genus is now included under **Phyllanthus** (which *see*).

KITAIBELIA (named in honour of Paul Kitaibel, 1757-1817, formerly Professor of Botany at Pesth, in Hungary). ORD. *Malvaceæ.* A genus consisting of but one species, which is an ornamental, hardy, robust-growing, tall, perennial herb. It thrives well in any rough garden soil, and may be readily increased by divisions.

K. vitifolia (Vine-leaved). *fl.* white or rose-coloured, showy, pedunculate. Late summer and autumn. *l.* five-lobed, acute, toothed, resembling those of the Vine in shape. *h.* 6ft. to 8ft. Eastern Europe. (B. M. 821.)

KITCHEN GARDEN. *See* **Garden.**

KLEINHOVIA (named after Kleinhoff, once Director of the Botanic Garden in Batavia). ORD. *Sterculiaceæ.* A genus consisting of a single species, which is a very handsome stove evergreen tree, native of India. It thrives in a compost of peat and loam. Cuttings of the young ripened shoots will root in sand, if placed in heat, under a bell glass.

K. Hospita (stranger). *fl.* pink, disposed in large terminal panicles. July to September. *fr.* top-shaped, bladdery, five-winged, with five cells, having a single seed in each. *l.* entire, three to seven-nerved. 1800.

KLEINIA (of Haworth). Now included under **Senecio** (which *see*).

KLOPSTOCKIA. A synonym of *Ceroxylon.*

KLUGIA (named in honour of Dr. William Klug, a lover of botany). SYN. *Glossanthus.* ORD. *Gesneraceæ.* A genus comprising three or four species of herbaceous plants, of which one is a native of Mexico and Central America, and the rest inhabit the East Indian Peninsula, Ceylon, and the Malayan Archipelago. Only one species

Klugia—*continued.*

—*K. Notoniana*—has yet been introduced. It is a stove evergreen, thriving in a mixture of equal parts sandy loam and peat, and requiring plenty of moisture while growing. Propagated by cuttings.

K. Notoniana (Noton's). *fl.* blue, in secund racemes; calyx five-angled. Summer. *l.* repandly toothed, half cordate, that is, with an unequal base. Stem fleshy, marked with a dense, villous line. *h.* 1ft. India, 1848. (B. M. 4620.)

KNIGHTIA (named after Thos. A. Knight, 1758-1838, a pomologist, and at one time President of the London Horticultural Society). SYN. *Rymandra.* ORD. *Proteaceæ.* A genus comprising three species of trees or shrubs, of which one is from New Zealand, and the two others from New Caledonia. Flowers geminate, pedicellate, in dense, sessile, axillary, lateral or terminal racemes. Leaves scattered, coriaceous, entire or deeply toothed. *K. excelsa*, the only species yet introduced, is an ornamental greenhouse evergreen tree, growing in its native country to a height of 100ft., and having much the habit of a Lombardy Poplar. It thrives in a compost of peat, to which a small quantity of sandy loam is added. Plenty of drainage must be afforded. Cuttings of ripe shoots, with leaves intact, except at the base, will root in sandy soil, under a bell glass, in a very gentle bottom heat.

K. excelsa (lofty). *fl.* flesh-coloured, in axillary racemes, which are nearly as long as the leaves, and covered with reddish-brown velvety down. *l.* very harsh, linear-oblong, coarsely and rather bluntly toothed, from 4in. to 6in. long. New Zealand, 1824. The wood of this tree is mottled with red and brown, and is largely employed in making furniture. (T. L. S. x. 2.)

KNIPHOFIA (named after Johann Hieronymus Kniphof, 1704-1763, a Professor of Medicine at Erfurt in the eighteenth century). SYNS. *Rudolphæmeria, Triclissa, Tritoma, Tritomanthe, Tritomium.* ORD. *Liliaceæ.* This small genus of hardy, tufted, herbaceous plants is usually known as *Tritoma*, but the name here adopted is a prior one, and, therefore, the more correct. The species number about sixteen, and are natives of tropical and South Africa and Madagascar. Flowers scarlet and yellow, showy, densely racemose or spicate, sub-sessile or shortly pedicellate, closely deflexed; scapes leafless, tall, simple. Leaves radical, long, narrow, firm. Kniphofias are very showy and ornamental border plants. They require protection throughout winter, in the more northern parts of the country. The species best known, and most extensively cultivated, is *K. aloides.* They all prefer a light, sandy soil, to which may be applied a liberal top-dressing of well-rotted manure, and plenty of water in spring and summer. Propagated by divisions of the crown, in early spring, or by seeds, when procurable.

K. aloides (Aloe-like).* Common Flame Flower. *fl.* handsome coral-red, fading to orange, and ultimately to a greenish-yellow, large, tubular, disposed in dense, oval-oblong spikes. Late summer and autumn. *l.* very long and narrow, channelled, keeled, toothed on the edges and keel. *h.* 3ft. to 4ft. South Africa, 1707. SYNS. *K. Uvaria* and *Tritoma Uvaria.* This is the handsomest species in cultivation, and one of the most gorgeous of autumn-flowering plants. It is suited equally well for the mixed border or shrubbery, or for planting in lines where there is a background of green foliage. There are several varieties of this species, including the following:

K. a. glaucescens (glaucous). South Africa, 1859.

K. a. maxima (large-flowered).* A variety much taller than the type, and having stouter stems and longer flower-spikes. It is sometimes known as *grandis.* Orange Free State, 1862. (B. M. 6553.)

K. a. serotina (late-flowering). South Africa, 1859.

K. Burchelli (Burchell's).* *fl.* scarlet and yellow, tipped with green; scape marked with black spots. Autumn. *l.* light green. *h.* 1½ft. South Africa, 1816. A very desirable plant. (B. R. 1745, under name of *Tritoma Burchelli.*)

K. carnosa (fleshy). *fl.* apricot-yellow, rather small, with bright yellow anthers; spike cylindrical, about 3in. long and 1½in. broad; scape about 1ft. high. Autumn. *l.* in several rosettes. Abyssinia, 1879. A handsome species.

K. caulescens (caulescent). *fl.* reddish-salmon colour at first, but ultimately becoming white tinged with greenish-yellow; disposed in a dense head of about 6in. in length; scape 4ft. to 5ft. long. Autumn. *l.* of a very glaucous blue-grey tint. Stem very thick. South Africa 1862. (B. M. 5946.)

Kniphofia—*continued.*

K. comosa (tufted). *fl.* yellow, disposed in a dense oblong-obtuse head; stamens very long. August. *l.* linear, erect, bright green acuminate, almost triquetrous. *h.* 1ft. to 2ft. Abyssinia, 1879. (B. M. 6569.)

K. foliosa (leafy). *fl.* bright yellow or tinged with red, in a dense cylindrical raceme, 6in. to 12in. long. August. *l.* in a dense basal rosette, ensiform, acuminate, 3in. to 4in. broad at the clasping base, tapering to a long point, green on both surfaces. Abyssinia, 1880. SYN. *K. Quartiniana.* (B. M. 6742.)

K. Leichtlinii (Leichtlin's).* *fl.* dull pale vermilion-red and yellow. August. *l.* 4ft. long, spreading all round, about ¾in. in diameter at one-third distance above the base, triquetrous, bright green. 1880. Abyssinia. (B. M. 6716.)

K. L. distachya (two-ranked). A robust variety, with broader leaves, and rather shorter flowers than the type; peduncle sometimes two or three-headed. 1884.

K. Macowani (MacOwan's). *fl.* bright orange-red, disposed in cylindric-ovoid racemes, 3in. to 5in. long. August. *l.* sub-erect, narrow-subulate, strongly keeled, deeply channelled. *h.* 1ft. to 1½ft. South Africa, 1874. (B. M. 6167.)

K. præcox (early). *fl.* bright red or yellow, on scapes nearly 2ft. long. May. *l.* about 2ft. long, sharply keeled, and with toothed edges. South Africa, 1862. A handsome species, with the habit of *K. aloides.* (Ref. B. 169.)

K. pumila (dwarf). *fl.* orange-red, in a dense-flowered raceme, 3in. to 5in. long; scape longer than the leaves. August. *l.* glaucous, with scabrid margins, 1ft. to 1½ft. long, about ½in. wide. South Africa, 1774. (B. M. 764, under name of *Tritoma pumila.*)

K. Quartiniana (Dr. Quartin Dillon's). A synonym of *K. foliosa.*

K. Rooperi (Rooper's).* *fl.* orange-red, becoming yellow with age, about 1½in. long, densely crowded; raceme 6in. to 8in. long, ovoid-oblong; scape stout, 1ft. long; bracts few, short. November. *l.* 1¼ft. long, 1¾in. broad, ensiform, gradually acuminate, deeply keeled at the back, dark green, not glaucous; margins serrulate. *h.* 2ft. British Caffraria, 1854. SYN. *Tritoma Rooperi.* (B. M. 6116.)

K. triangularis (three-angled). Very like *K. Macowani*; but the foliage is broader and longer, and in this respect it resembles *K. aloides.* A very desirable plant.

K. Uvaria (Uvaria). A synonym of *K. aloides.*

KNIVES. Various descriptions of Knives are used in gardens, and some, at least, are indispensable for budding, grafting, pruning, and many other purposes. They are specially manufactured for different work, and the numerous sorts are named accordingly. Budding Knives have usually an ivory handle, and either a straight edge on the blade, or one curved backwards at the point. These are also in general use for propagating, and for other light work. Pruning Knives are of various forms, the blade in some being immovable in the handle, and the Knife kept in a sheath when not in use. The handles of Pruning Knives should be of buckhorn, to prevent slipping of the hand when using them. A curved blade is best adapted for pruning large branches, or for use in ordinary rough work, a straight-edged one being preferable for small shoots. Knives for Peach-pruning are sometimes made with a blade tapering from the back to a fine point, to admit of their cutting out small shoots where crowded, without causing injury to those left. The Vegetable Knife has a large curved blade, and is chiefly used for cutting and dressing vegetables. An Asparagus Knife has a serrated blade on the end of an iron shank, 1ft. or more long, which is

FIG. 361. ASPARAGUS KNIFE.

fixed into a handle somewhat like that of a trowel (see Fig. 361). It is made in this way for cutting off the young shoots below ground. *See also* **Budding Knives** and **Pruning Knives.**

KNOWLTONIA (named in honour of Thomas Knowlton, 1692-1782, once Curator of the botanic garden at Eltham). SYN. *Anamenia.* ORD. *Ranunculaceæ.* This

Knowltonia—*continued.*

genus comprises five or six species of greenhouse or half-hardy perennial herbs, having a very acrid juice, natives of the Cape of Good Hope. Flowers dull-coloured, in branching cymes or umbels; petals whitish, yellowish, or greenish. Leaves from the rootstock stalked, three-parted, or twice three-parted; leaflets stalked, toothed or cut. The species thrive in a loam and peat soil. Propagated by dividing at the root, or by seed.

K. vesicatoria (blistering). *fl.* yellow, green, in simple few-flowered umbels. February to April. *l.* biternate, thick; segments ovate or cordate, serrulate, or nearly entire. *h.* 1½ft. 1691. (B. M. 775.)

KNOXIA (named after R. Knox, a traveller, and resident in Ceylon). SYN. *Cuncea.* ORD. *Rubiaceæ.* A genus containing six or eight species of hirsute, glabrous, or pubescent, stove evergreen herbs or sub-shrubs, natives of the whole of India, Java, China, the Philippine Islands, and tropical Australia. Flowers rose or lilac, small, in terminal, sessile, or pedunculate cymes; corolla salver or funnel-shaped, with lanceolate segments and a hairy throat. Leaves opposite or sub-fasciculate in the axils, petiolate, ovate, or lanceolate. The species thrive in a compost of peat and loam. Cuttings of young shoots will root in sand, during April or May, if placed under a glass, in a gentle heat. The species described below is the only one in cultivation.

K. corymbosa (corymbose). *fl.* white or purplish. Summer. *l.* lanceolate, villous. Stem cylindric or obscurely four-angled, dichotomously branched. *h.* 2ft. to 3ft. India, 1820. A slender, erect annual.

KŒHLERIA. This is regarded, by Bentham and Hooker, as synonymous with **Isoloma** (which *see*).

K. hondensis. *See* **Isoloma hondense.**

K. Seemanni. *See* **Isoloma Seemanni.**

KOELLENSTEINIA. A synonym of *Aganisia.*

KŒLLIKERIA (named after Professor Koelliker, of Wurzburg, author of a List of the Wild Plants of Zurich, &c.). ORD. *Gesneraceæ.* A monotypic genus, the species being a low herbaceous stove plant. It succeeds in a compost of loam and leaf mould, with a little sand intermixed. Propagation may be effected by division of the tubers.

FIG. 362. KŒLLIKERIA ARGYROSTIGMA, showing Habit and detached Single Flower.

K. argyrostigma (silver-spotted). *fl.* white or cream-colour, spotted with red; racemes erect, from the axils of the upper leaves, glanduloso-hirsute, longer than the leaves. Summer. *l.* opposite, elliptical, obtuse, downy, deep rich velvety-green, with scattered, rounded, white spots. Stem short, branched. *h.* 1ft. Tropical America, 1845. See Fig. 362. (B. M. 4175, under name of *Achimenes argyrostigma.*)

KOELREUTERIA (named after Joseph G. Koelreuter, 1733-1806, once Professor of Natural History at Carlsruhe). ORD. *Sapindacéæ*. A monotypic genus. The species is a small, handsome, hardy deciduous tree, from North China, having a picturesque, irregular habit of growth. Any ordinary garden soil suits it; but it thrives best, and flowers most freely, in a sheltered situation. Propagated by cuttings of the young shoots, in spring; or by layers, in early autumn.

FIG. 363. KOELREUTERIA PANICULATA, showing Leaf and Portion of Inflorescence.

K. paniculata (panicled).* *fl.* yellow, disposed in large, terminal, many-flowered, branched panicles. June and July. *fr.* or capsule large, vesiculate, inflated, three-lobed, very conspicuous in autumn. *l.* alternate, exstipulate, deciduous, impari-pinnate; leaflets opposite or alternate, membranaceous, deeply toothed. *h.* 10ft. to 15ft. 1763. See Fig. 363. (B. R. 330.)

KŒNIGA (name revived by Robert Brown, in commemoration of Charles Kœnig, formerly of the British Museum). ORD. *Cruciferæ*. A small genus of very pretty hardy plants, included, by Bentham and Hooker, under *Alyssum*, but which, for garden purposes, may be kept distinct. Flowers racemose or clustered; petals entire; pouch sub-ovate, with flattish leaves; cells one or few-seeded. The species are of easy culture in any ordinary soil, and may be increased by seeds, sown in spring.

K. maritima (sea). Common Sweet Alyssum. *fl.* white, small, very sweet-scented; racemes terminal, somewhat leafy at the base. Spring. *l.* quite entire, almost linear, hoary. *h.* 6in. to 9in. Europe. This elegant little, much-branched, self-sowing annual is an excellent bee plant. SYN. *Alyssum maritimum*. (Sy. En. B. 140.)

Kœniga—*continued.*

K. m. variegata (variegated). *l.* edged with white or yellow. A very effective, half-hardy plant, requiring protection during winter.

K. spinosa (thorny).* *fl.* white, in small terminal clusters. Early summer. *l.* lanceolate, acute, silvery. Stem shrubby; old branches and peduncles spiny. *h.* 4in. to 8in. France, 1683. A pretty alpine. SYN. *Alyssum spinosum*.

KOHL-RABI (*Brassica oleracea Caulo-rapa*). Kohl-Rabi is a very distinct vegetable, not very largely cultivated, except as a field crop. It comes between the Cabbage and Turnip, and is generally used as a substitute for the latter. The upper part of the stem swells into a large fleshy head above ground, resembling a Turnip

FIG. 364. KOHL-RABI.

(see Fig. 364). Kohl-Rabi has several advantages over some other vegetables, and consequently deserves a place in gardens. It is exceedingly hardy, withstanding even severe frosts, and also resists drought much better than the Turnip.

Cultivation. Like all other plants of the *Brassica* tribe, Kohl-Rabi is raised from seed, which should be sown outside (any time from April to June, inclusive), in an ordinary seed bed, or where the crop is intended to be grown. In the former case, transplant, when 2in. high, into any good, well-manured ground, allowing a distance of about 1¼ft. between the rows, and 1ft. in the rows; and, if the latter plan is adopted, thin out to these distances. Water should be given for a time until fresh roots are emitted. An occasional hoeing, to keep the surface soil open and clean, is nearly all that will be necessary for after-treatment. The fleshy heads are fit for use when about the size of a Dutch Turnip. The crop is frequently of great importance when failure with Turnips is caused by insects or drought, which seldom affect the Kohl-Rabi.

Sorts. There are about half-a-dozen sorts in cultivation, but only two are recommended for garden purposes; the others are more or less coarse and vigorous in habit. These are Early Purple Vienna and Early White Vienna, dwarf and useful sorts, the bulbs varying chiefly in the colour of their skins. They are not good if allowed to get old and large before being used.

KOLA-NUT TREE. *See* **Cola.**

KOPSIA (named after Jan Kops, 1765-1849, Professor in Utrecht). SYN. *Calpicarpum*. ORD. *Apocynaceæ*. A genus comprising four species of stove, evergreen, glabrous trees or shrubs, allied to *Cerbera*; they are natives of the Malayan Peninsula and Archipelago. Flowers white or pink, very ornamental, in short cymes; corolla salver-shaped; tube elongated, slender. Leaves opposite, mem-

Kopsia—*continued.*

branaceous or sub-coriaceous, penninerved. Only one species has been yet introduced; it thrives in a compost of peat and sandy loam. Cuttings of rather firm young shoots will root in sand, if placed in a gentle bottom heat.

K. fruticosa (shrubby). *fl.* red, in terminal corymbs. May. *l.* broad, lanceolate. Pegu, 1818. A stove evergreen shrub. (B. M. 4220; B. R. 391, under name of *Cerbera fruticosa.*)

KOROLKOWIA SEWERZOWI. *See* **Fritillaria Sewerzowi.**

KORTHALSIA (named after Peter W. Korthals, a German botanist, of this century). SYN. *Calamosagus.* ORD. *Palmeæ.* A genus comprising about sixteen species of stove palms, natives of the Malayan Archipelago and New Guinea, closely allied to *Calamus.* Flowers small; spadices loosely racemose, pendulous. Leaves alternate, pinnatisect. For culture, *see* **Calamus.**

K. Junghuhnii (Junghuhn's). *l.*, long-stalked, terminating in a hooked tendril-like process; segments seven to nine, cuneate-rhomboid, shortly apiculate, pale whitish beneath. Java.

K. scaphigera (scape-bearing). *l.* pinnate, 2ft. to 4ft. long; rachis sparingly armed with short retrorse spines, terminating in a long, recurved, thorny tendril; young ones fugaciously white-tomentose beneath. Andaman Isles, Malacca. A large climbing palm, with canes up to ½in. in diameter.

KRAMERIA (named after John George Henry and William Henry Kramer, father and son, Austrian botanists). ORD. *Polygaleæ.* A genus comprising twelve species of diffuse, stove, glabrous trees or shrubs, natives of the warmer parts of America. Flowers axillary, or on the tops of the branchlets, generally solitary or disposed in spike-formed racemes. Leaves alternate, coriaceous. Only two species have been introduced. *K. pauciflora* thrives in a compost of sandy loam and fibry peat. Cuttings will root in sand, if placed under a hand glass, in heat. The same treatment will answer for the other species.

K. pauciflora (few-flowered). *fl.* red; pedicels few, longer than the leaves, bearing two bracts on the middle of each. *l.* oblong-linear, villous. *h.* 4ft. Mexico, 1824.

K. triandra (three-stamened). *fl.* shining scarlet. Summer. *l.* alternate, irregularly scattered or crowded, sessile, obovate, apiculate, entire, clothed with adpressed silvery hairs. Peru. Low shrub. This plant furnishes the Rhatany root of the British Pharmacopœia; the essential constituent of rhatany is a form of tannic acid. (B. M. Pl. 30.)

KREYSIGIA (named after F. L. Kreysig, 1769-1839, a German botanist, and author of a treatise on the comparison of animal and vegetable life). SYN. *Tripladenia.* ORD. *Liliaceæ.* A monotypic genus, the species being a very pretty, half-hardy, herbaceous perennial, having a roughish, simple stem, and a knotty rhizome. It is of easy culture in any ordinary garden soil. Increased by divisions, in spring.

K. multiflora (many-flowered). *fl.* pink; peduncles slender, one, two, or rarely three-flowered; pedicels filiform. June. *l.* ovate or ovate-lanceolate, cordate-amplexicaul, acute, 2in. to 3in. long, prominently nerved. Stems ascending or erect. *h.* 9in. to 18in. Queensland and New South Wales, 1823. (B. M. 3905; L. B. C. 1511, under name of *Schelhammera multiflora.*)

KUHLIA. *See* **Fagræa.**

KUHNIA (named after Adam Kuhn, an American botanist). ORD. *Compositæ.* A monotypic genus, the species being a pretty little hardy perennial herb. It thrives in sandy loam. Increased by division, in spring.

K. eupatorioides (Eupatorium-like). *fl.-heads* cream-coloured. September. *l.* varying from broadly lanceolate and toothed to linear and entire. North America, 1812.

KUMQUAT. *See* **Citrus japonica.**

KUNTHIA DEPPEANA. *See* **Chamædorea elegans.**

KUNZEA (named after Gustav Kunze, 1793-1851, a botanist and physician of Leipsig). ORD. *Myrtaceæ.* A genus comprising fifteen species of greenhouse shrubs, often Heath-like, confined to Australia. Flowers sessile, or rarely pedicellate in the upper axils, more frequently

Kunzea—*continued.*

in terminal heads, rarely an oblong spike below the end of the branch. Leaves alternate, or rarely opposite, small, entire. Probably the two species described below are the only members of the genus introduced to our gardens. For culture, *see* **Callistemon.**

K. Baxteri (Baxter's). *fl.* large, like those of a Callistemon, in dense terminal spikes; petals rich red. *l.* crowded, linear-oblong or lanceolate, flat, obtuse, or somewhat acute, about ½in. long. A rigid, minutely pubescent plant, of several feet in height. (B. R. 1838, 7, under name of *Callistemon macrostachyum.*)

K. corifolia (Coris-leaved). *fl.* white, nearly sessile, solitary in the upper axils of short leafy branchlets. *l.* linear or linear-lanceolate, usually crowded on the branchlets or clustered in the axils, ¼in. to ½in. long. A tall shrub. (L. B. C. 1998 and S. E. B. 59, under name of *Leptospermum ambiguum.*)

KYDIA (named after Colonel Robert Kyd, who died in 1794, founder and first Director of the Calcutta Botanic Garden). ORD. *Malvaceæ.* A small genus (two or three species) of slender, stellato-tomentose, stove evergreen trees, natives of India. Flowers in long panicles. Leaves palmate-nerved, entire or lobed. The species thrive in a well-drained compost of sandy peat and fibry loam. Cuttings of half-ripened shoots will root in sand, under a bell glass, in heat.

K. calycina (large-calyxed). *fl.* white or pink; involucel four-leaved, much longer than the calyx. *l.* rounded-cordate, palmately seven-nerved. 1818. (B. F. S. 3.)

K. fraterna (brotherly). *fl.* white; involucel six-leaved, shorter than the calyx. 1823.

KYLLINGA (named after Peter Kylling, 1640-1696, a Danish botanist of the seventeenth century). SYN. *Kyllingia.* ORD. *Cyperaceæ.* A rather large genus (about sixty species have been described, although scarcely twenty are sufficiently distinct to merit specific rank) of perennial or rarely annual stove herbs, broadly dispersed throughout tropical regions. Inflorescence usually in solitary heads; spikes compressed, one or two-flowered. The species are of little or no horticultural value. For culture, *see* **Cyperus.**

K. monocephala (one-headed). *fl.-heads* whitish, terminal, sessile, oval; involucre three-leaved, unequal, the largest leaf as long as the culm. *l.* sheathing, smooth, sharp-keeled. India, &c., 1868.

KYLLINGIA. *See* **Kyllinga.**

LABARIA PLANT OF DEMERARA. A common name of **Dracontium polyphyllum** (which *see*).

LABELLUM. The lip. In *Orchideæ*, and some other families, the name of Lip, or Labellum, is given to one of the divisions or lobes of the perianth.

LABELS. For indicating the names of plants and trees, either under cultivation or travelling from one place to another, the use of Labels is essential and indispensable. Those made of strong paper or parchment are largely employed for attaching to plants when packing, as they are light, and bend readily under pressure, without causing injury. The use of ink should be avoided, and blacklead pencil substituted with some sorts, otherwise the name may become obliterated, because of moisture causing the ink to run. Narrow pieces of sheet lead, with the name, or a number, punched near one end, form durable Labels, and are constantly used in some nurseries, but more extensively on the Continent. Wooden Labels are usually made of deal; but other sorts of wood are employed, such as elm, oak, and teak, when any are required to last a long time. Labels made of cast iron, zinc, iron coated with zinc, slate, porcelain, and other substances, may be procured, if desired; but scarcely one of them can equal, in neatness or general usefulness, those properly made of wood. The iron very soon rusts, and consequently requires burning and re-writing; slate and porcelain break in all directions, and are thus

Labels—*continued.*

rendered useless. Zinc is usually written on with an indelible ink, consisting of a solution of sulphate of copper, and applied with a quill pen or pointed piece of wood; but Labels made of it are frequently far from satisfactory. The sizes may be indefinite when wood is used, and, by careful painting and preparation, the Labels may be rendered very durable. If only required for ordinary use, a little white paint on one side will suffice. Any name may be easily erased with a piece of glass, and the Label used for other plants until it decays. Before permanently placing wooden Labels in the open ground, they should be painted all over and dried, adding a second coat at the time of writing, and then finally dipping the part intended for insertion in the ground into creosote, gas-tar, or any other preservative solution.

LABIATÆ. An extensive order of herbs, shrubs, or sub-shrubs, rarely arborescent or scandent, found chiefly in temperate regions of the Old World. Flowers in the axils of leaves or bracts, solitary or geminate, or in clustered centrifugal cymes, which form false whorls by their union in pairs, and are scattered, or crowded into spikes; calyx persistent, tubular, dentate, lobed or two-lipped; corolla gamopetalous; tube evolute, short, or elongated, many-formed; limb four or five-lobed; æstivation imbricate, sometimes bilabiate, the upper lip entire or emarginate, the lower three-lobed, from the upper lip being very short and deeply cleft, sometimes being bell or funnel-shaped, with four sub-equal lobes and sub-equal stamens. Leaves opposite or whorled, with pinnate reticulate nerves, exstipulate. "*Labiatæ* forms one of the most natural groups of plants; the characters of its members are so uniform that it may be called monotypic, as if all the species could be comprehended in a single genus, and the discrimination of its genera is hence often very difficult" (Decaisne and Le Maiout). Many of the genera yield a valuable oil. Basil, Horehound, Hyssop, Lavender, Marjoram, Mint, Patchouly, Rosemary, Sage, Savory, and Thyme, belong to this order. There are about 140 genera and 2600 species. The following are examples: *Ælanthus, Anisochilus, Coleus, Cunila, Hyssopus, Lamium, Lophanthus, Perilla, Salvia.*

LABIATE. "A term applied to that form of a monopetalous calyx or corolla which is separated into two unequal divisions, the one anterior, and the other posterior, with respect to the axis."

LABICHEA (named after M. Labiche, an officer of the French ship "Uranie," who accompanied Freycinet in his voyage round the world). ORD. *Leguminosæ.* A genus of five species of unarmed greenhouse evergreen shrubs or sub-shrubs, natives of Australia. Flowers yellow, in axillary, often few-flowered, racemes; sepals and petals sometimes only four; stamens two. Leaves impinnate, or reduced to the terminal leaflet. Labicheas thrive in a compost of peat and loam. Cuttings of half-ripened shoots will root, during summer, in sand, if placed under a bell glass. The following is the only species now in cultivation.

L. diversifolia (various-leaved). A synonym of *L. lanceolata.*

L. lanceolata (lance-shape-leaved). *fl.* bright golden-yellow; base of the upper petal stained with red; raceme about six-flowered. April to June. *l.*, leaflets narrow-linear or lanceolate, terminating in a sharp spiny point. *h.* 6ft. Western Australia, 1840. A compact bushy plant. (B. M. 6751.) SYN. *L. diversifolia* (under which name it is figured in L. & P. F. G. 52).

LABILLARDIERA. A synonym of *Billiardiera.*

LABIOSE. Applied to a polypetalous corolla which has the appearance of being labiate.

LABISIA (from *labis*, a spoon; in allusion to the form of the corolla divisions, which resemble the bowls of small spoons). Spoonflower. ORD. *Myrsineæ.* A genus comprising three or four species of very glabrous or

Labisia—*continued.*

puberulous, small stove shrubs, with the habit of *Pothos*, confined to the Malayan Archipelago. Flowers white, minute, in terminal, elongated, fasciculate racemes. Leaves few, sessile or petiolate, lanceolate, acuminate, entire or denticulate; petiole or base of leaf sheathed. The undermentioned is probably the only species grown in our gardens. It should be potted in sandy loam, to which a little rough peat is added, and placed in a humid atmosphere, with a gentle bottom heat. Plenty of water should be applied to the roots; and overhead syringings, in fine weather, will prove beneficial. Propagation may be effected by seeds.

L. pothoina (Pothos-like). *fl.* white, small, each lobe of the corolla resembling the bowl of a small spoon. June. *l.* palmate, slender, entire or denticulate; petioles swollen at base, decurrently articulated with the stem. Stem 1ft. or more high. (B. R. 1845, 48.)

LABLAB (*Lablab* is the Arabic name of *Convolvulus*). ORD. *Leguminosæ.* This genus contains a few species, the one best known being that described below, which is widely cultivated throughout many tropical countries as a food plant; its pods and seeds being eaten as are kidney beans and haricots amongst us. For culture, *see* **Dolichos.**

L. vulgaris (common). *fl.* violet. June. *l.*, leaflets roundish-ovate, ending in a point furnished with a bristle. India, 1794. Stove climber. Now included under *Dolichos*, the correct name being *D. Lablab* (under which name it is figured in B. M. 896). SYN. *Lablavia vulgaris* (S. B. F. G. ser. ii. 236).

LABLAVIA VULGARIS. *See* **Lablab vulgaris.**

LABOUCHERIA. A synonym of *Erythrophlœum.*

LABRADOR TEA. *See* **Ledum.**

LABURNUM (the old Latin name used by Pliny). ORD. *Leguminosæ.* A genus comprising only three species of hardy, glabrous or puberulous trees or shrubs, natives of Europe and Asia Minor. Flowers yellow,

FIG. 365. FLOWERING BRANCHLET OF LABURNUM ALPINUM.

disposed in terminal racemes; calyx shortly toothed; lip ovate or orbiculate. Leaves digitately three-foliolate. The species are readily raised from seed, and the varieties easily propagated by grafting or budding on the

Laburnum—*continued.*

common sorts. Laburnums thrive in almost any soil or situation. The genus was formerly included under *Cytisus*.

L. Adami (Adam's).* *fl.* dull purplish, disposed in long pendulous racemes. This remarkable graft hybrid is said to have been raised by Jean Louis Adam, in 1825, by shield-grafting *Cytisus purpureus* on *L. vulgare*. A most extraordinary thing in connection with it is the complete reversion of some parts of the same tree to one or the other of the parents. SYN. *Cytisus Adami.*

L. alpinum (alpine).* Scotch Laburnum. *fl.* yellow; racemes pendulous; pedicels and calyces puberulous. June. Pod shorter than that of *L. vulgare*, smooth, with distinctly-winged upper suture. *l.* petiolate, glabrous; leaflets ovate-lanceolate, rounded at the base. Branches terete. *h.* 15ft. to 20ft. Europe, 1596. Hardy tree. SYN. *Cytisus alpinus.* See Fig. 355. *C. fragrans*, *C. hirsutum*, and *C. pendulum* (a form with pendent branches), are varieties.

L. caramanicum (Caramanian). *fl.* large, in erect racemes, arranged in panicles. June. *l.* small, shortly stalked. *h.* 3ft. to 4ft. Asia Minor, 1879. SYN. *Podocytisus caramanicus.*

L. vulgare (common).* Common Laburnum; Golden Chain. *fl.* yellow; racemes pendulous, simple; pedicels and calyces clothed with adpressed pubescence. April to June. Pod clothed with hairs; upper suture thickened and keeled, but not winged. *l.* petiolate; leaflets ovate-lanceolate, pubescent beneath. Branches terete, whitish. *h.* 20ft. Southern France to Hungary, 1596. SYN. *Cytisus Laburnum* (under which name it is figured in B. M. 176). The following are the best varieties of this very beautiful spring-flowering tree:

L. v. aureum (golden). An interesting variety, with golden-yellow leaves.

L. v. Carlieri (Carlier's). A free-flowering form, with very narrow leaflets and long racemes.

L. v. involutum (curled). A vigorous grower, with the leaflets curled so as to form "rings."

L. v. Parkesii (Parkes'). Racemes very long; flowers deeper-coloured than those of the type. An excellent variety, raised about 1840.

L. v. quercifolium (Oak-leaved). Leaflets sinuated and lobed, so as to resemble a miniature Oak-leaf in outline.

L. v. Watereri (Waterer's). For length of raceme, depth of colour, and floriferousness, this is, perhaps, the best of all the varieties.

LAC. A fluid having an opaque appearance, and occurring in many plants.

LACÆNA (a Greek adjective, meaning native of Lacedæmon; one of the names of Helen of Troy, which was applied to this genus on account of its beauty). ORD. *Orchideæ*. A genus of two species of stove epiphytal orchids, natives of Central America. They are very closely allied to *Lycaste* and *Anguloa*. For culture, *see* **Acineta.**

L. bicolor (two-coloured). *fl.* greenish-yellow, streaked and spotted with violet and dark purple. May. *h.* 1ft. Guatemala, 1843. (B. R. xxx. 50.)

L. spectabilis (showy). *fl.* pinkish-white, dotted with small spots, 1in. in diameter; lip having the central one of the three lobes prolonged into a stalked spade-shaped body, thickly dotted; spikes loose, pendulous. May. *l.* elliptic. Pseudo-bulbs oblong-ovoid. *h.* 6in. Mexico, 1853. (B. M. 6516.)

LACE BARK OF JAMAICA. *See* **Lagetta lintearia.**

LACEPEDEA. A synonym of **Turpinia** (which *see*).

LACERATE. Torn; having a torn appearance.

LACEWING FLIES. These are frequently called Golden-eyes (*Chrysopa vulgaris*, &c.). They belong to the *Neuroptera*. The flies have usually slender bodies, and rather large, delicate wings, reaching from 1in. to 1¾in. in their span. The whole insect is usually green, varying in depth, often tinted with yellow; the eyes are very brilliant, resembling small golden-yellow beads. The eggs are attached, by means of long hair-like stalks, to a branch, many near one another, and have more than once been mistaken for the fruits of a moss The larvæ are ½in. long, oval in form, and depressed, and have strong jaws, six jointed legs, and hairs along the sides of the body. They live on Aphides, sucking their victims dry, and casting away the skins. These insects have a most

Lacewing Flies—*continued.*

unpleasant smell; hence they are often known as Stink Flies. An allied genus, *Hemerobius*, includes several species, similar in form to *Chrysopa*, but smaller, seldom exceeding 1in. in span of wings, and with the body and wings of a brown or grey colour. It is like *Chrysopa* in feeding, while young, on Aphides, but the larvæ clothe themselves with the skins of the Aphides killed by them. Both genera are rather common.

LACHENALIA (named after W. de Lachenal, 1736-1800, Professor of Botany at Basel). ORD. *Liliaceæ*. A rather large genus (about thirty species) of greenhouse bulbous plants, natives of South Africa. Flowers sessile, spicate, or in pedicellate racemes, erect, spreading, or pendulous; perianth tubular or almost campanulate; scape simple, leafless. Radical leaves two (or, in a few species, three to five), rather thick, oblong, lorate, linear, or sub-terete, often spotted or pustulate. Bulbs tunicated. Lachenalias are among the most distinct and beautiful of dwarf bulbous plants for greenhouse decoration. Some of the species are very rare; but, fortunately, one of the best, *tricolor*, is plentiful, and is that most commonly seen. *L. aurea* (a variety of *L. tricolor*) and *L. Nelsoni* are also extra fine—especially the latter—and worthy of the most extensive cultivation so soon as the stock, which is now somewhat limited, admits. The flowering season, with most species, is spring and early summer; that of a few of the rarer kinds being, however, dispersed throughout the year. Propagation is effected by the increase of bulbs round those of the previous year, which also remain good. *L. tricolor* increases very rapidly, and all of its bulbs, except the smallest, flower the following season.

Cultivation. About the beginning of August is the best time for the annual repotting. The whole stock of any species to be grown should be taken out of the dry soil in which the bulbs are usually kept while at rest, and placed together in order that the large and smaller sizes may be selected, and grown separately, to produce spikes uniform in strength in each pot. Efficient drainage must be provided, and the compost here recommended is two parts loam to one of leaf soil and dried cow manure; some sharp river sand or road grit being also added, to insure the free passage of water. The bulbs should be placed in the pots or pans in which they are intended to flower, as no further repotting will then be necessary. Pans from 9in. to 12in. in diameter are well adapted for Lachenalias, where they are procurable, and there is a sufficient stock to fill them. Pots 5in. in diameter are those best suited, and about six bulbs should be placed in each. Select the strongest for the pans, and cover, in either case, with ½in. of soil. Place them afterwards on a moist bed of ashes, in a cool, shallow pit or frame, where frost is merely excluded in winter. A good watering may be given at first, to settle the soil; but scarcely any more will be needed until growth commences. Air and all possible light must be admitted throughout the winter, to induce a sturdy growth, and extra room should be allowed as the plants require it. It is advisable to give air to Lachenalias on all favourable occasions in winter, as they soon become drawn in a close or warm atmosphere. Cold draughts disfigure the foliage, particularly in February and March, causing a stunted growth; consequently, in airing, special care must be taken. A little artificial manure may be applied with advantage so soon as the flower-spikes can be seen. This is preferable to the use of manure water, as the latter can scarcely be kept off the leaves, or from lodging in their axils, to the detriment and injury of the flowers. Forcing is sometimes recommended, but it should not be practised unless a quantity of plants are at hand to keep a succession; all Lachenalias being very much sturdier and better when kept altogether in a cool place, away from the drying influences of fire heat. When in flower, they present a much finer appearance in a green-

Lachenalia—*continued.*

house, if arranged in masses, than when isolated as single pots or pans of plants. Each of the bulbs, if strong, will produce from one to four flower-spikes, and these keep in excellent condition, in a cool house, for nearly two months. When flowering is over, the plants should be placed in the full sun, to insure a thorough ripening; and when the leaves die away, the bulbs may be stored, and kept quite dry until starting time returns. Provided the following primary and important points are followed, the successful culture of Lachenalias becomes an easy matter: Prepare a rich, open soil; apply but little water in winter, until growth is somewhat advanced, but give plenty afterwards; admit all possible light and air, and, at the same time, avoid draughts and the use of fire heat, except that necessary for excluding frost and dispelling damp.

L. anguinea (serpent). *fl.* whitish, tubular-campanulate; racemes about twenty-flowered; scape spotted. April. *l.* always solitary, lanceolate, fleshy-herbaceous, 6in. to 7in. long, 1in. broad, spotted. *h.* 6in. 1825. (L. & P. F. G. ii. 179.)

L. angustifolia (narrow-leaved). A synonym of *L. contaminata.*

L. aurea (golden). A synonym of *L. tricolor lutea.*

L. bifolia (two-leaved). A synonym of *L. isopetala.*

L. contaminata (contaminated). *fl.* white, often more or less tinged with red, densely sub-spicate, campanulate. March. *l.* six to ten, semi-terete, 3in. to 8in. long, often spotted, channelled. *h.* 2in. to 6in. 1774. (B. M. 1401.) SYN. *L. angustifolia* (B. M. 735).

L. fistulosa (fistular). *fl.* fragrant; calyx white, tinged with sky-blue; sepals brown at tip; petals white, edged with purple; spike loose, 2in. long; scape as long as the leaves. *l.* two, lanceolate, fleshy, unguiculate, 4in. long, 3in. broad. 1884.

L. fragrans (sweet-scented).* *fl.* reddish, very fragrant; racemes about twenty-flowered. May. *l.* two, oblong-ovate, green. *h.* 6in. 1798. (A. B. R. 302.)

L. glaucina (milky-green). *fl.* white, more or less tinged with yellow or red, sub-spicate. May. *l.* two, rarely three, fleshy-herbaceous, lanceolate; margins cartilaginous, often spotted. *h.* 3in. to 6in. 1795. (B. M. 3552.) SYN. *L. sessilifolia* (A. B. R. 460).

L. isopetala (equal-petaled). *fl.* white, or more or less tinged with red. May. *l.* two, fleshy-herbaceous, lorate-lanceolate, acute, 6in. to 9in. long. *h.* 4in. to 8in. 1804. SYNS. *L. bifolia* (B. M. 1611), *L. rosea* (A. B. R. 296.)

L. lilacina (lilac).* *fl.* about twenty in an oblong spike; calyx bright lilac, blue at base; petals same colour, widely spreading; sepals ovate-oblong; scape 4in. to 5in. long, greenish-red, mottled with red-brown. *l.* two, lanceolate, falcate, 4in. long, ½in. to ¾in. broad. 1884.

L. lucida (shining). *fl.* white, tinged with yellow or red, sweet-scented; racemes ten to fifteen-flowered. April. *l.* two, fleshy-herbaceous, lanceolate, 5in. to 6in. long, 1in. broad, smooth. *h.* 4in. to 6in. 1798. (B. M. 1372.) SYN. *L. pallida* (B. R. 287).

L. mutabilis (changeable). A synonym of *L. orchioides.*

L. Nelsoni (Nelson's).* This is a very handsome hybrid, having golden-yellow flowers, numerously disposed in long racemes. 1881. (F. M. n. s. 452.)

L. nervosa (nerve-leaved). *fl.* whitish, tinged with green and red, tubular-campanulate; racemes twenty to thirty-flowered. June. *l.* two, fleshy-herbaceous, ovate-oblong, spreading, abundantly nerved, smooth, or rarely slightly blistered. *h.* 3in. to 6in. 1810. (B. M. 1497.)

L. odoratissima (very sweet-scented). *fl.* in a rather dense raceme; sepals white, with a green tip; petals very spreading at the tips; scape shorter than the leaves. *l.* two, lanceolate, falcate, fleshy, blistered over the face, 6in. long, ½in. to ¾in. broad. 1884.

L. orchioides (Orchis-like). *fl.* whitish or yellowish, or more or less tinged with red or blue, sub-spicate, fragrant, closely set on a spotted scape 9in. long. April and May. *l.* two, or rarely three, lanceolate, fleshy-herbaceous, dark green, often spotted, with cartilaginous margins; scape 3in. to 9in. high, often spotted. 1752. This species exhibits considerable variation in the colouring of its flowers. (B. M. 854, 1269; Ref. B. 171.) SYNS. *L. mutabilis* (S. B. F. G. ser. ii. 129; L. B. C. 1076), *L. pulchella.*

L. pallida (pale). *fl.* whitish, or more or less tinged with red, sub-spicate. May. *l.* two, fleshy-herbaceous, lanceolate, 6in. to 12in. long, with cartilaginous margins. *h.* 6in. to 9in. 1782. This is scarcely more than a large variety of *L. glaucina.* (B. R. 1350, 1945; Ref. B. 170.)

L. pallida (pale). A synonym of *L. lucida.*

L. pendula (drooping).* *fl.* of a deep purple, red, and yellow colour, about 1in. long, closely and gracefully set on the stout and spotted scape. April. *l.* erect, lorate-lanceolate, dark green, sometimes slightly spotted. *h.* 4in. to 9in. 1789. A strong-growing and very handsome species; probably the largest and showiest of the whole genus. (A. B. R. 41; B. M. 590.)

Lachenalia—*continued.*

L. pulchella (pretty). A synonym of *L. orchioides.*

L. purpureo-cærulea (purplish-blue).* *fl.* purplish-blue, campanulate; racemes thirty to forty-flowered. April. *l.* two, rarely three, fleshy-herbaceous, lanceolate, blistered, 6in. to 8in. long, ½in. broad. *h.* 6in. to 9in. 1789. (A. B. R. 251; B. M. 745.)

L. pustulata (blistered). *fl.* whitish, sub-spicate; scape nearly equalling the leaves. February. *l.* two, fleshy-herbaceous, lanceolate, 6in. to 9in. long, blistered. *h.* 1ft. 1799. (A. B. R. 350; B. M. 817.)

L. quadricolor (four-coloured). A synonym of *L. tricolor.*

L. q. lutea (yellow). A synonym of *L. tricolor lutea.*

L. racemosa (raceme-flowered). *fl.* whitish, slightly tinged with red; racemes twelve to twenty-flowered; scape slightly spotted. May. *l.* two, rarely three, fleshy-herbaceous, lanceolate, thickly blistered. *h.* 3in. to 4in. 1811. (B. M. 1517.)

L. rosea (rosy). A synonym of *L. isopetala.*

L. rubida (reddish). *fl.* ruby-red, tube-shaped, on a thickly-spotted scape 6in. long. September. *l.* lanceolate, in twos, slightly spotted. *h.* 9in. 1803. (B. M. 993.) This species has two varieties, *tigrina* and *punctata*, in which the flowers are of a pale ground-colour, thickly spotted with deep red.

L. serotina (late-flowering). A synonym of *Dipcadi serotina.*

L. sessilifolia (sessile-leaved). A synonym of *L. glaucina.*

L. tricolor (three-coloured).* *fl.* bright green, red, and yellow, about 1in. long, disposed all along the upper part of the erect scape. Spring. *l.* in twos, lorate-lanceolate, spreading, dark green, spotted with dull purple. *h.* 1ft. 1774. (B. M. 82.) SYN. *L. quadricolor* (A. B. R. 148).

L. t. lutea (yellow).* This is a form with the perianth altogether yellow. SYNS. *L. quadricolor lutea* (B. M. 1704), *L. aurea.*

L. unifolia (one-leaved). *fl.* white, in many-flowered racemes; pedicels two to three lines long. March. *l.* always solitary, fleshy-herbaceous, linear, 6in. to 12in. long, with blood-coloured blotches or spots. *h.* 4in. to 15in. 1795. (B. M. 766.)

L. violacea (violet). *fl.* white, tinged with violet and green, tubular-campanulate. March. *l.* two, fleshy-herbaceous, lorate, 8in. to 9in. long, 1½in. broad, smooth, spotted. *h.* over 1ft. 1795. (L. B. C. 1129, under name of *L. bicolor.*)

LACHNÆA (from *lachnæos*, downy; referring to the downy clothing of the flower-heads). ORD. *Thymelaceæ.* A genus of eighteen species of greenhouse evergreen shrubs, natives of the Cape of Good Hope. Flowers in terminal heads, frequently surrounded by bracts; perianth coloured, tubular, four-cleft. Leaves opposite or scattered. Lachnæas thrive in a sandy-peat soil, and require a somewhat sheltered and shady situation. Propagated, in spring, by cuttings of short young shoots, placed in sand, under a bell glass.

L. buxifolia (Box-leaved).* *fl.-heads* white, woolly. May to July. *l.* oval, sessile, very smooth. *h.* 2ft. 1800. (B. M. 1657).

L. b. glauca (glaucous). *fl.-heads* white, woolly. May to July. *l.* scattered, elliptical, ovate. *h.* 2ft. 1800. (B. M. 1658.)

L. conglomerata (clustered). *fl.-heads* white, clustered. June and July. *l.* loose. *h.* 2ft. 1773.

L. eriocephala (woolly-headed). *fl.-heads* white, solitary, woolly, imbricated in four rows. June and July. *h.* 2ft. 1793. (B. M. 1295.)

L. purpurea (purple).* *fl.-heads* purple, smooth. June and July. *l.* opposite. *h.* 2ft. 1800. (B. M. 1594.)

LACHNANTHES (from *lachne*, down, and *anthos*, a flower; in allusion to the woolly flowers). SYNS. *Gyrotheca* and *Heritiera* (of Gmelin, not of Aiton). Red-root. ORD. *Hæmodoraceæ.* A monotypic genus. The species is a half-hardy, marsh or aquatic, herbaceous perennial, the roots of which yield a red dye. It thrives in a peat and loam compost, and may be increased by dividing the roots, in spring.

L. tinctoria (dyer's). *fl.* dingy yellow, within loosely woolly, disposed in a dense, compound, terminal cyme. July. *l.* sword-shaped, clustered at the base, and scattered on the stem, which is hairy above. *h.* 1½ft. Southern United States (in sandy swamps), 1812.

LACHNOSTOMA (from *lachne*, wool, and *stoma*, a mouth; in allusion to the bearded corolla throat). SYNS. *Chthamalia, Ibatia, Pherotrichis.* ORD. *Asclepiadeæ.* A genus comprising about sixteen species of stove or greenhouse, twining or prostrate, pubescent or villous, shrubby herbs, inhabiting tropical, and the warmer parts of North, America. Flowers often rather small; cymes contracted, two or few-flowered, or rarely umbellately

Lachnostoma—*continued.*

many-flowered. Leaves opposite, often cordate. The undermentioned species—probably the only one in cultivation—requires culture similar to **Gonolobus** (which *see*).

L. maritimus (sea-loving). *fl.*, corolla green at back and edge, purple in the middle; umbels sessile, few-flowered, between the petioles. June and July. *l.* downy, cordate, acuminate, with the recess of the base open; petioles as long as the leaves. Stems densely downy backwards. Caracas, &c. An inelegant twiner. (B. R. 931, under name of *Gonolobus maritimus.*)

LACINIATE. Jagged; cut or divided into unequal segments.

LACISTEMACEÆ. A natural order of shrubs or small trees, all natives of tropical America, extending from Brazil and Peru as far as the West Indies and Mexico. Inflorescence of axillary, solitary, or fascicled spikes; perianth of two to six (usually four) petaloid segments, persistent. Leaves alternate, shortly petiolate, entire, penniveined; stipules none. The order contains but one genus, *Lacistema,* and sixteen species.

LACKEY MOTH (*Bombyx Neustria*). These insects vary considerably in colour, but the upper wings are usually brown, tinged with red or yellow, crossed by a darker band margined with pale bars; the fringes along the hind margin are alternately pale and dark. The lower wings are usually red-brown, with an indistinct paler crossbar. The female lays her eggs on the twigs of various trees, such as Apple, Oak, Elm, &c., in spirally-arranged groups, each about ½in. long (see Fig. 366). When the larvæ emerge from the eggs in spring, they are black. For a considerable time, they live in society, spinning a web over the branches and leaves. From the web they go out to feed on the neighbouring branches, but return to it in wet weather, and in the evening; and often they may be seen sunning themselves on its surface. When nearly full fed, they wander apart from one another, to seek out a suitable place—between leaves, among rubbish, in crevices of bark, or elsewhere—to spin an oblong yellow

Lackey Moth—*continued.*

cocoon, with which a sulphury powder is plentifully mixed. When nearly mature, the larvæ are gaudily coloured—the head is blue-grey, with two black spots, like eyes; the next segment is blue-grey, with four black spots; the other segments are alike, striped with white down the middle of the back, and with orange-red, blue, and black, on the sides. The pupa is smooth and brown. The moths emerge in July. The Lackey Caterpillars seldom do serious harm, except when they attack the Apple-tree; and they never seem to be so hurtful in England as they are at times in France and Germany. They have not been recorded from Scotland.

Remedies. The best is hand-picking. The eggs, when noticed on the branches, should be destroyed; but the best success follows the removal of branches bearing the webs and the young larvæ, since these webs are readily seen. Something should be held below, to catch larvæ that may drop off. They may also be shaken off the branches, and crushed below the trees. The ground should be kept clear of weeds and other cover for such as fall, or are seeking for a safe shelter in which to spin their cocoons, and to become pupæ.

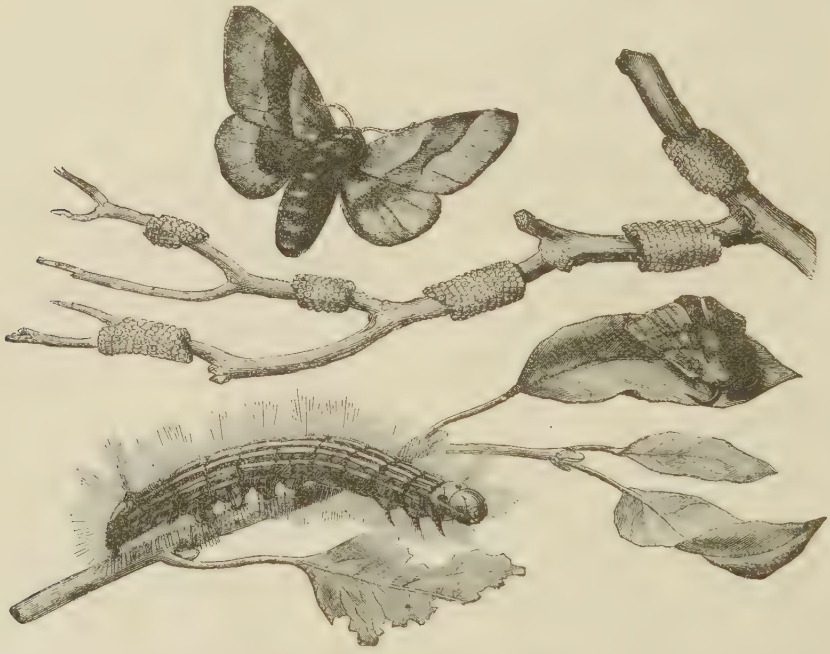


FIG. 366. LACKEY MOTH (BOMBYX NEUSTRIA).

LACOSTEA. Included under **Trichomanes** (which *see*).

LACTESCENT. Containing lac, or milk.

LACTUCA (the old Latin name, from *lac,* milk; in reference to the milky juice). Lettuce. Including *Mulgedium.* ORD. *Compositæ.* A genus comprising about sixty species of hardy, and usually weedy, annuals or perennials, natives of the temperate regions of the Northern hemisphere and South Africa, only a few of which are worth growing. Flower-heads blue or yellow; involucre of few bracts, in several series, placed upon a flat, naked receptacle. Fruits somewhat flattened, surmounted by a long, slender beak, and a pappus of long, silky, silvery hairs. Leaves radical or alternate, entire, largely dentate or pinnatifid; margins setose-ciliate or naked. Stems erect, branching. Lactucas thrive in a deep but light or sandy loam, and

Lactuca—*continued.*

may be increased by divisions of the roots, or by seeds. All the species of *Lactuca* abound in a milky juice, which partakes, in a considerable degree, of the qualities of opium. The production of this juice is lessened by culture, and especially by blanching. It is most abundant in plants in a wild state, and in both wild and cultivated Lettuce during inflorescence. It is from the juice of the Lettuce that the late Dr. Duncan, of Edinburgh, prepared the drug called Lactucarium, which is occasionally used as a mild narcotic or sedative where opium is not admissible. *See also* **Lettuce.**

L. alpina (alpine).* *fl.-heads* purplish-blue, large, numerous, disposed in a corymbose cluster. July. *l.* somewhat lyrate, the terminal lobe triangular and very large. Stems furrowed, erect, smooth below, hairy above. *h.* 3ft. Arctic and Alpine Europe, West Siberia, and Scotland (but very rare). Perennial. A handsome plant for a somewhat shaded position, in very moist, deep, loamy soil. (Sy. En. B. 809, under name of *Mulgedium alpinum.*)

L. macrophylla (large-leaved). *fl.-heads* pinkish-purple, large, corymbose. July. *l.* radical, large, cordate. Stems stout. *h.* 4ft. Caucasus. A noble species.

L. macrorhiza (large-rooted).* *fl.-heads* bright light violet-purple, about 1in. in diameter, and disposed in loose corymbs. Autumn. *l.* variously formed, sometimes lyrate-pinnatifid, with one or two pairs of lateral lobes, and a large, roundish, terminal one; sometimes very slightly lyrate-pinnatifid, and at other times oblong; those of the stem with broad amplexicaul auricles. *h.* 6in. to 3ft. Himalayas. Perennial. (B. R. xxxii. 17, under name of *Mulgedium macrorhizon.*)

L. perennis (perennial). *fl.-heads* light blue, in corymbose panicles. June to August. *l.* all pinnatifid; segments linear, toothed upwards. *h.* 2ft. South Europe, 1596. (B. M. 2130.)

L. Plumieri (Plumier's). *fl.-heads* purple, disposed in large, spreading, terminal corymbs, with short bracts. Summer. *l.* broad, large, pinnatifid-runcinate, glaucous underneath. *h.* 6ft. South of France. A handsome perennial, like *L. alpina*, but larger and more ornamental.

L. sativa (cultivated). Common Lettuce. *fl.-heads* pale yellow, disposed in corymbs on a stem about 3ft. high. June. *l.* large, roundish or roundish-oblong, entire, slightly toothed, milky. *h.* 4ft. Generally considered to be a cultivated race derived from *L. Scariola*, a widely-distributed weed. Annual. (B. M. Pl. 161.)

L. tuberosa (tuberous).* *fl.-heads* pale blue, over 1in. across, disposed in loose panicles. Autumn. *l.* about 1ft. long, 9in. wide, runcinate-pinnatifid, with lanceolate, somewhat recurved, finely-toothed lobes. *h.* 1ft. to 1½ft. An ornamental perennial, with a neat habit. Tauria.

LACUNA. An intercellular space, circumscribed by a great many cells.

LACUNOSE. Having numerous large, deep excavations.

LADYBIRDS (*Coccinella*). These are a group of small beetles of very great value to horticulturists,

FIG. 367. GRUB OF SEVEN-SPOTTED LADYBIRD (enlarged).

inasmuch as the larvæ (see Fig. 367) feed on Aphides, and aid much in limiting their ravages. The *Coccinellidæ* have never more than three distinct joints in the tarsi, have antennæ shorter than the thorax, and are usually hemispherical in form. The legs are short, and are seen very little beyond the wing-cases. The species are numerous, but form a very natural assemblage in respect of structure, though the individual species are so variable in colour as to have been often described under several names. They excrete, from the joints of the legs, drops of a yellowish fluid with a disagreeable smell. At times, Ladybirds appear in countless swarms, especially after severe attacks of Aphides on Hops or other cultivated plants. They are commonly red with black spots, but vary in size and number of spots, and may be black with red spots, or unspotted red or black, or more or less marked with yellow. Among the commoner species are:

Ladybirds—*continued.*

C. septempunctata (Seven-spotted Ladybird, see Fig. 368), *C. bipunctata* (Two-spotted), *C. undecimpunctata* (Eleven-

FIG. 368. SEVEN-SPOTTED LADYBIRD.

spotted), and *C. variabilis.* In Roman Catholic times, in Britain, these insects were regarded as sacred to the Virgin: hence the name Ladybirds, or Ladycows.

LADY FERN. *See* **Asplenium Filix-fœmina.**

LADY'S GARTERS. A name applied to the striped garden variety of **Phalaris arundinacea** (which *see*).

LADY'S MANTLE. *See* **Alchemilla.**

LADY'S SLIPPER. *See* **Cypripedium Calceolus.**

LADY'S SMOCK. *See* **Cardamine.**

LÆLIA (named after a vestal virgin of that name, because of the delicacy of the flowers). SYN. *Amalias.* ORD. *Orchideæ.* A genus comprising about twenty species of beautiful Orchids, natives of the warmer parts of America, from Brazil to Mexico. They are closely allied to *Cattleya*, and are distinguished principally therefrom in having eight pollen masses. Flowers numerous or few, on terminal scapes. Leaves thick, hard. Pseudo-bulbs often elongated, clavate, and stem-like. For culture, &c., *see* **Cattleya.**

L. acuminata (pointed-lipped). *fl.* 1in. to 2in. across; sepals and petals pure white; lip white, with a dark blotch on the upper part; spikes five or six-flowered, 1ft. to 1½ft. long. December and January. *l.* solitary, oblong, thick. Pseudo-bulb rather roundish in outline, and flat. Mexico, 1840. (B. M. 4905.) There is a pretty variety of this species, with delicate rosy-violet flowers.

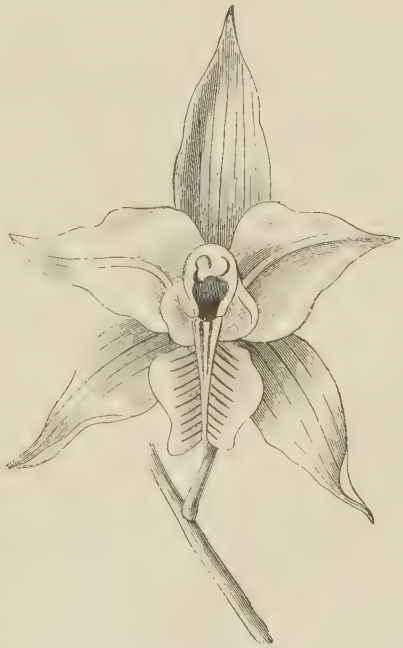


FIG. 369. FLOWER OF LÆLIA ALBIDA.

L. albida (whitish).* *fl.* very fragrant, 1½in. to 2in. across; sepals and petals mealy-white; lip white, or pale pink, streaked in the centre with lines of yellow; scape slender, from the top of the

Lælia—*continued.*

pseudo-bulb, from 1ft. to 2ft. long, and three to six-flowered. December and January. *l.* ligulate, coriaceous, dark green, usually in twos. Pseudo-bulbs roundish, clustered. Guatemala, 1838. See Fig. 369. (B. M. 3957.) There are several forms of this handsome species, some producing much larger flowers, with broader petals, than the type, while, in others, the sepals and petals are of a deep flesh-colour, with a rich mauve lip. The following varieties are especially worthy of mention:

L. a. brunnea (brown). *fl.*, sepals and petals, and the anterior part of the lip, of a fine chestnut-brown; base of lip marked with beautiful purplish veins. Mexico, 1868. A handsome, neat, and useful variety.

L. a. Mariannæ (Marian's). *fl.*, sepals and petals flesh-colour, changing to salmon; lip mauve, with buff stripes. A very pretty cool-house variety, with compact habit, and pale green foliage.

L. a. ochracea (ochreous). *fl.*, sepals and petals pallid brown; lip with a white disk, washed with purple in front of the column, and with purplish veins on the lateral segments; the anterior part brownish. Mexico, 1868.

L. a. rosea (rosy). *fl.* tipped with purple. Mexico, 1869. (F. M. 335.)

L. a. Tuckeri (Tucker's). *fl.* amethyst, purple, and yellow. Mexico, 1868.

L. anceps (two-edged).* *fl.* fragrant, 2in. to 4in. across; sepals and

FIG. 370. FLOWER OF LÆLIA ANCEPS.

petals rose-lilac; lip deep purple, shaded with lilac; scape three to six-flowered. December and January. *l.* solitary, or in pairs, broadly-lanceolate, bright shining green. Pseudo-bulbs ovate, somewhat four-angled, from 4in. to 6in. long. Mexico, (about) 1834. This thrives on a block, but, as it attains to a considerable size, its weight renders it best adapted for pot cultivation. Large specimens are remarkably handsome, producing as many as twenty scapes of flowers. See Fig. 370. (B. M. 3804; B. R. 1751.) There are several varieties of this very handsome cool-house orchid, varying principally in the intensity of colour, or in the number of flowers which are borne upon the scape. The following are well worth cultivating:

L. a. alba (white).* *fl.* pure white; lip with a few yellow streaks. Mexico.

L. a. Barkeriana (Barker's).* *fl.* purple. Mexico, 1833. Very scarce.

L. a. Calvertiana (Calvert's). A fine variety, somewhat like *Dawsoni*, but with narrower petals, a rose border to the side lobes of the lip, and the front lobe wholly red-purple. 1883.

Lælia—*continued.*

L. a. Dawsoni (Dawson's).* A distinct, beautiful, and rare variety, with little if anything in its growth to distinguish it from the normal state of the type; but the inflorescence cannot be mistaken for any other species or variety. The sepals and petals are of a pure waxy-white; the lip is three-lobed, the side lobes being white, and the centre one purple streaked with lines of a deeper purple; the ridge, as in the normal state, being yellow. Mexico, 1868. (F. M. 530.)

L. a. delicata (delicate).* *fl.*, sepals and petals white, stained with rosy-purple; lip white, suffused with reddish-purple and shaded with violet, the throat being orange-yellow; spikes four to six-flowered. Mexico. A distinct and handsome form.

L. a. Hilliana (Hill's). A distinct variety, with the front lobe of the lip two-lobed, and with a deep orange-coloured disk

L. a. Leeana (Lee's).* *fl.*, sepals and petals rose-coloured, narrow; lip white, with the tips of the lateral lobes, and some veins, of a rich purple. 1882. A handsome variety.

L. a. pulcherrima (very handsome). *fl.*, lip truncate at tip; lateral angles and front third of middle lobe mauve-purple; disk light orange, with purple-brown veins. 1883.

L. a. rosea (rosy). *fl.* bright rose; disk of lip yellow, marked with dark lines. Mexico, 1880.

L. a. vestalis (vestal). A very fine broad-petaled variety, with white flowers, having the callus, disk, and bases of the side lobes, of a deep shining sulphur-colour. 1880.

L. a. Warnerii (Warner's).* *fl.*, sepals and petals light soft rose; lip of an intense crimson. June and July.

L. a. Wolstenholmæ (Mrs. Wolstenholm's). *fl.* medium-sized; sepals and petals light amethyst, the former dotted on the edges with purple, the latter margined with purple; lip wholly deep purple. A handsome variety.

L. autumnalis (autumnal).* *fl.* very finely fragrant; sepals lanceolate, spreading, and petals oblong-lanceolate, waved at the edges, both being of a beautiful soft rose-colour; lip three-lobed, rosy-white, with a yellow centre; scape about 1ft. high, terete, three to six-flowered. December and January. *l.* two or three, linear-oblong, spreading, coriaceous, bright green. Pseudo-bulbs ovate, ribbed, tapering to the apex. Mexico, 1838. A handsome species, thriving best on a block, and requiring plenty of moisture when young. (B. M. 3817; B. R. 1839, 27.)

L. a. atrorubens (dark red).* *fl.* rich reddish or magenta-purple, deepest toward the tips of sepals and petals, especially so on the upper part of the lip, while the lower is almost pure white, and does not clasp the column, as in other species; sepals and petals revolute at tips; peduncles long. Pseudo-bulbs short.

L. callistoglossa (very beautiful-lipped). *fl.*, sepals and petals rose-colour; lip having the disk whitish, with purple lines, and the front part of a warm dark purple. 1882. A garden hybrid between *L. purpurata* and *Cattleya Warscewiczii*. Of this very fine and distinct plant, there are several varieties, some of them having much richer-coloured flowers.

L. caloglossa (beautiful-lipped).* *fl.* light purple; lip with an anterior, crisp, crenulate disk, dark-purplish, bordered with white; lateral edges light purplish. Gardens, 1877. A lovely hybrid.

L. cinnabarina (scarlet-flowered).* *fl.* orange-scarlet, with a crispy lip; scape erect, 1ft. to 1½ft. high, three to five-flowered. March. *l.* usually solitary, erect, dark green, from 4in. to 6in. long. Pseudo-bulbs thick and rounded at the base, somewhat flask-shaped. Brazil, 1836. This fine species is best suited for pot culture. (B. M. 4302.)

L. crispilabia (curled-lipped). *fl.* rosy-purple; lip finely crisped or undulate; scape from 12in. to 16in. long, and three to five-flowered. *l.* solitary, ligulate. Pseudo-bulbs pyriform. Mexico, 1867. A very free-flowering species, known in gardens as *L. Lawrenceana*. (W. S. O. ser. ii. 6.)

L. Dayana (Day's).* *fl.*, sepals and petals rosy-purple; lip rich purple, margined with lilac and white. Brazil, 1877. A handsome free-flowering species, not unlike *L. præstans*. (B. H 1880, 10.)

L. Dominiana (Dominy's).* *fl.* large; sepals and petals light purple, the former with dark reticulations; lip deep blackish-purple; scape three-flowered. Autumn. *l.* solitary, oblong-ligulate. Pseudo-bulbs fusiform. Gardens, 1878. A handsome hybrid.

L. Dormaniana (Dorman's).* *fl.*, sepals and petals olive, marbled outside with light port-wine colour, which is diffused as a light line inside, excepting at the top of the odd sepal and petal,

Lælia—*continued.*

which have numerous dark spots around the limb; lip lightest purplish-white, with darker veins; middle lobe mauve-purple; scape two to five-flowered. February. *l.* one or two, very cuneate, oblong-ligulate. Pseudo-bulbs terete, thin, slender, about 1ft. high. Brazil, 1880. (G. C. n. s., xiii. 168.)

L. elegans (elegant).* *fl.*, sepals and petals white or rose, varying to carmine; lip deep rich purple; scape erect, three to six or more flowered. It flowers at various seasons, sometimes twice in a year. *l.* usually in twos, spreading, coriaceous, dark green. Pseudo-bulbs long, slender, stem-like. Brazil, 1865. A very beautiful species, succeeding best under pot culture. (B. M. 4700, under name of *Cattleya elegans.*)

L. e. alba (white).* *fl.* white, 6in. in diameter, having the middle lobe of the lip, and a middle line running to its base, rich carmine-magenta. 1884. A grand variety. (I. H. 526.)

L. e. gigantea (gigantic). *fl.* large; sepals and petals lilac or mauve, profusely spotted with rosy-purple; lip intensely rosy-purple; scape many-flowered. Brazil, 1862. A very desirable strong-growing kind. SYN. *L. gigantea.* (W. S. O. 6.)

L. e. Houtteana (Van Houtte's). *fl.*, lip with nearly rectangular blunt side laciniæ; median lacinia having at top a much-dilated, nearly reniform, toothleted blade of richest purple, while the ends of the side laciniæ have a little touch of mauve on their purple.

L. e. lobata (lobed). A curious variety, having petals very narrow, and bearing one obtuse lobe on either side, having also rectangular side laciniæ of the lip. Brazil, 1869.

L. e. Marshalliæ (Mrs. Marshall's). *fl.*, petals purplish, handsomely veined; lip rich deep purple, broad, wavy, and recurved. Brazil, 1872.

L. e. picta (painted). *fl.*, sepals and petals light rose, marked with greyish zones, and small dark purple spots; lip yellow, with the tips of the side lobes and disk purple. 1884.

L. e. prasiata (topaz-like). *fl.*, sepals rose-magenta, whitish in the centre, and greenish towards the base; petals rosy-lilac; lip white where it wraps round the column; disk of the richest magenta.

L. e. Turneri (Turner's).* *fl.* none more than 6in. across; sepals and petals deep rose-pink, slightly veined with a darker hue; lip of a rich magenta, shaded with rose. Brazil, 1863. A beautiful species. SYN. *L. Turneri.* (W. S. O. 12.)

L. flammea (flame-coloured).* *fl.* 3in. to 4in. across; sepals and petals vivid orange-scarlet; lip purple-crimson, beautifully fringed at the margin. March and April. A very handsome hybrid, the result of a cross between *L. cinnabarina* and *L. Pilcheri*, in habit somewhat resembling the first-named. SYN. *L. Veitchii.*

L. flava (yellow). *fl.* very brilliant yellow, about 2in. across; scape 1ft. to 1½ft. high, from three to five-flowered. April. Brazil, 1841. A pretty species, similar to *L. cinnabarina* but rather smaller, and the leaves are shorter and more erect. (B. R 1842, 62.)

L. furfuracea (scurfy-stalked). *fl.* about 5in. in diameter, rosy-purple or bright lilac, with a darker lip; scape usually two-flowered. Autumn. *l.* usually solitary, light green. Mexico, 1838. A fine species, resembling *L. autumnalis* in habit, but with much broader petals. (B. M. 3810.)

L. gigantea (gigantic). A synonym of *L. elegans gigantea.*

L. grandis (large). *fl.*, sepals and petals of a light nankeen colour; lip white in the throat, edged and veined with lilac and purple. Summer. *l.* usually solitary, rigid, dark green. Stems small at the base, thicker at the upper part. Bahia, 1850. (B. M. 5553.)

L. harpophylla (sickle-leaved).* *fl.*, sepals and petals bright orange-scarlet; lip of the same colour, with a white blotch at the apex; scapes short, erect, five to ten-flowered. February and March. *l.* solitary, lanceolate. Pseudo-bulbs slender, cylindrical, about 1ft. high. Brazil, 1873. (F. M. n. s. 70.)

L. Jongheana (Jonghe's).* *fl.* from 4in. to 5in. across; sepals lanceolate, 2½in. long, of a beautiful bright amethyst-purple tint; petals ovate or oblong, nearly 2in. broad, with slightly wavy margins of the same colour as the sepals; lip having pale purple lateral lobes, yellowish outside, golden-yellow within, having seven lamellæ or plates over its disks; central lobe of a pure white, with a narrow margin of the brightest amethyst-purple; spikes one or two-flowered. *l.* dark green. Brazil, 1872. (B. M. 6038; G. C. 1872, 425.)

L. Lawrenceana (Lawrence's). A garden synonym of *L. crispilabia.*

L. Lindleyana (Lindley's).* *fl.*, sepals and petals white or pale rose-colour, 2in. long, lanceolate; lip rosy-lilac, pale creamy-yellow, blotched and streaked with pale purple on the disk; peduncles one or two-flowered. *l.* in twos, thick, narrow, glaucous, 5in. to 7in. long. Pseudo-bulbs erect, slender, 6in. to 9in. high. Brazil, 1865. This plant flowers freely at various parts of the year, and remains from three to six weeks in perfection. (B. M. 5449, under name of *Cattleya Lindleyana.*)

L. majalis (May-flower).* *fl.* of a bright silvery-lilac, from 4in. to 5in. across; lip blotched with crimson-purple, margined with

Lælia—*continued.*

rosy-lilac, centre white; scape one-flowered. Early summer. *l.* solitary. Pseudo-bulbs ovate, almost the size of pigeons' eggs. Mexico, 1838. A very beautiful species, known to the Mexican Spaniards as the Flor de Maio, or May Flower. It is somewhat difficult to manage, and should be grown in a cool house, being fully exposed to the sun all the year round, and suspended near the glass. (B. M. 5667; B. R. 1844, 30.) There is a white-flowered variety in cultivation.

L. monophylla (one-leaved).* *fl.* (excepting the purple anther) entirely orange-scarlet, 1½in. in diameter; sepals and petals equal, oblong, acute; lip exceedingly small, adnate to the column; peduncles one-flowered, with two or three greyish speckled sheaths. Stems very slender, one-leaved. Jamaica, 1883. A showy, free-flowering little species. (B. M. 6683.)

L. Mylamiana (Mylam's). A curious hybrid between *Cattleya crispa* and *C. granulosa*, the flowers closely resembling those of the first-named parent; spike about six-flowered. *l.* solitary, leathery, ovate, obtuse, 8in. long. Pseudo-bulbs stout, cylindrical, about 1ft. high. Gardens, 1876. (G. C. n. s., ii. 741.)

L. peduncularis (peduncled). *fl.*, sepals and petals of a beautiful dark rose; lip same colour, with darker spots in the centre. Winter. Mexico, 1841. A very pretty evergreen species, with a compact habit, somewhat resembling *L. acuminata.* (B. R. 1845, 69.)

L. Perrinii (Perrin's).* *fl.*, sepals and petals rosy-purple, tipped with purplish-magenta; lip deep crimson, distinctly three-lobed; scape erect, three to six-flowered. October and November. *l.* solitary, narrow, dark green, 9in. to 12in. long. Pseudo-bulbs stout, purplish, clavate, distinctly furrowed. Brazil, 1831. (B. R. 1828, 2.)

L. P. irrorata (bedewed). *fl.* light rose-colour; lip nearly white, with a pale yellow disk, and a light purple apex. 1881. A fine form.

L. P. nivea (snowy). A very pretty variety, having pure white flowers, with the end of the lip purple. Brazil, 1880. (F. M. 429.)

L. Philbrickiana (Philbrick's).* *fl.* very beautiful; sepals and petals light chestnut-brown, with purple spots; lip anterior; blade transverse, sub-cordate, emarginate, deep rich purple, with a little white triangle in the middle of the base; side laciniæ oblong-triangular, whitish, with light purple borders; disk light purple, with a whitish line; scape two-flowered. *l.* in twos, the larger 3½in. long, 1⅔in. wide. Pseudo-bulbs dwarf. 1879. A garden hybrid between *L. elegans* and *Cattleya Aclandiæ.*

L. Pilcheriana (Pilcher's). *fl.*, sepals and petals light rose, oblong-ligulate; lip rolled round the column, three-lobed, the anterior part very crisp; disk whitish-yellow, with deep purplish veins. Gardens, 1868. A handsome hybrid between *L. Perrinii* and *Cattleya crispa.*

L. præstans (excelling).* *fl.* solitary, or very rarely two together; sepals and petals broad, rich deep rose; lip crimson-purple. April and May. Pseudo-bulbs and leaf rarely exceeding 6in. in height. Brazil, 1859. A very beautiful dwarf-growing species, often flowering twice in a year, and thriving best on a block of wood or cork. It resembles *Cattleya marginata* in growth and size of flowers. (B. M. 5498.)

L. purpurata (purple-stained).* *fl.* very large; sepals and petals pure white; lip very large, sometimes as much as 3in. in length, rich deep purplish-crimson; scape erect, three to seven-flowered. May to July. *l.* solitary, broad, leathery, dark green. Pseudo-bulbs large, stout. Brazil, 1852. This species has been often, and not without reason, styled the grandest orchid in cultivation. It is one of the noblest for exhibition purposes; and grows best in a pot, in coarse fibrous peat, with fresh sphagnum, crocks, and charcoal freely interspersed. The pot must be half full of crocks, and the plants need plenty of water when growing. (G. C. n. s., xx. 533; P. F. G. iii. 962; W. S. O. 40.) Of the several varieties, the undermentioned are most desirable:

L. p. alba (white). *fl.* pure white; lip faintly tinted and veined with pale rose, and stained with yellow at the base. Brazil, 1869.

L. p. Nelisii (Nelis's). *fl.* large; sepals and petals white, tinged with rose on the inside, whilst the sepals only on the outside are of a rich rose-colour; lip large, reddish-crimson. Brazil.

L. p. Williamsii (Williams's).* *fl.* large, over 5in. across; sepals and petals beautiful delicate rose; lip rich crimson, very large; spike three or four-flowered. May and June. *l.* rich dark green. Brazil.

L. superbiens (gorgeous-flowered).* *fl.* from 6in. to 8in. across; sepals and petals rich rose, streaked with red; lip deep crimson, striped with yellow; spike about 5ft. high, bearing from ten to twenty flowers near the apex. Winter. *l.* in twos, thick, leathery, rather light green. Pseudo-bulbs spindle-shaped, long, stout. Guatemala, 1840. (B. M. 4090; W. S. O. 20.)

L. Turneri (Turner's). A synonym of *L. elegans Turneri.*

L. Veitchiana (Veitch's).* *fl.*, sepals delicate lilac; petals of a deeper colour, with pale amethyst-purple spots; anterior half of lip crimson-purple, with a sulphur-yellow disk behind, streaked with purple in centre; the whole with a narrow pale lilac border. *l.* dark green, of great substance. A gorgeous hybrid. (G. C. n. s., 1883, Aug. 4.)

L. Veitchii (Veitch's). A synonym of *L. flammea.*

Lælia—*continued.*

L. virens (green). This species is something like *L. cinnabarina*, but has greenish-yellow sepals and petals, and a narrow, three-lobed, white lip. 1879.

L. Wallisii (Wallis's).* *fl.* of a charming rosy-blush colour; lip finely marked with yellow. Rio Negro, 1866. A remarkably beautiful epiphyte, with the aspect of *Cattleya bulbosa*.

L. Wyattiana (Wyatt's). *fl.*, petals white, very acute; lip almost rhomboid; nervings of disk dark purple; side lobes light yellow outside; anterior lobe fine light purple. A lovely hybrid.

L. xanthina (yellow-flowered).* *fl.* of a clear golden-yellow, from 2in. to 3in. across; lip whitish, with orange streaks on the disk; scapes erect, five to seven-flowered. Summer. *l.* solitary or in tubes. Pseudo-bulbs clavate, 9in. to 12in. high. Brazil, 1859. (B. M. 5144.)

LÆLIOPSIS (from *Lælia*, and *opsis*, resemblance; on account of the similarity between the two genera). ORD. *Orchideæ*. A genus of three or four species of stove epiphytal Orchids, from the West Indies. *Læliopsis* was founded by Lindley on the plant described below; in his own words, it is "a Cattleya in all respects, except that the flowers are membranous, and the veins of the lip bearded." For culture, *see* **Cattleya.**

L. domingensis (St. Domingo). *fl.* gay lilac, a little veined with yellow in the middle of the lip; lip two-lobed, with its divisions wavy, denticulate, recurved; scape slender, naked, bearing about eight flowers. *l.* oblong, coriaceous, obtuse. Pseudo-bulbs two-leaved. 1851. (L. & P. F. G. iii. 105.)

LÆVIGATE. Having the appearance of being polished, as many seeds.

LAFOENSIA (named after the Duke of Lafoens, 1719-1806, once President of the Lisbon Academy of Science). SYN. *Calyplectus*. ORD. *Lythrarieæ*. A small genus (about six or eight species have been described) of glabrous stove trees or shrubs, natives of Brazil and New Grenada. Flowers large, solitary and axillary, or often in short terminal panicles. Leaves opposite, oblong or obovate, acute or obtuse, entire, shining, glandular at the apex. Only one species has been introduced into this country. For culture, *see* **Lagerstrœmia.**

L. microphylla (small-leaved). *fl.* reddish-brown, showy, large. *l.* elliptic, leathery, shortly stalked. Brazil, 1847.

LAGASCA. *See* **Lagascea.**

LAGASCEA (named after M. Lagasca, a Spanish botanist and professor at Madrid, who died in 1839). Sometimes spelt *Lagasca*. SYN. *Noccæa*. ORD. *Compositæ*.

Lagascea—*continued.*

A genus comprising about seven species of rather rigid stove shrubs or herbs, natives of Mexico and Central America. Flower-heads doubly compound, solitary, or in leafy, crowded, corymbose panicles; each floret having a slender, tubular, white, yellow, or red corolla. Leaves opposite, or the upper ones alternate, entire or toothed. The species are not particularly valuable for horticultural purposes. For culture, *see* **Dysodia.**

L. latifolia (broad-leaved). *fl.-heads* white, fragrant, terminal; bracts six to eight; florets five-toothed, woolly outside. June. *l.* opposite, sessile, more or less clasping the stem at the base, oblong or elliptical, taper-pointed. *h.* 10ft. to 12ft. Mexico. Shrub. (S. B. F. G. 215, under name of *Nocca latifolia*.)

L. mollis (soft). *fl.-heads* white; involucre five-leaved. August and September. *l.* petiolate, ovate, acuminate, sub-serrate, sometimes quite entire. Cuba. Plant velvety. Annual. (B. M. 1804.)

LAGENARIA (from *lagena*, a flask; in allusion to the usual form of the fruit). Bottle Gourd. ORD. *Cucurbitaceæ*. A monotypic genus, the species being a hardy, musky, pubescent annual. For culture, *see* **Gourds.**

L. vulgaris (common).* *fl.* white, large, monœcious, rarely diœcious, stellate, fascicled. August. *fr.* shaped like a bottle, when ripe of a pale yellow colour, sometimes growing 6ft. in length, with a roundish bottom and a neck; probably poisonous. *l.* cordate, nearly entire, biglandular at the base, pilose. Asia and tropical Africa, 1597 (now cultivated in most tropical countries). See Fig. 371. There are numerous varieties, differing principally in the shape of the fruit.

FIG. 371. FLOWERING BRANCH (1, Female Flower; 2, Male Flower) AND FRUIT OF LAGENARIA VULGARIS.

LAGENOPHORA (from *lagenos*, a flask, and *pherein*, to bear; referring to the flask-like involucres). SYNS. *Ixauchenus* and *Microcalia*. ORD. *Compositæ*. A genus comprising about a dozen species of small, Daisy-like, greenhouse herbaceous plants, inhabiting New Zealand and Australia. They are distinguished from *Bellis* in the achenes being narrowed into a beak at the top. Flower-heads small, solitary, on slender scapes; ray-florets white or pale blue, numerous, spreading; disk-florets yellow, tubular. Leaves alternate, lanceolate, entire. Lagenophoras thrive best in a light soil. Propagation may be effected by divisions, in spring. The species are seldom seen under cultivation.

L. Billardieri (Billardière's). *fl.-heads*, involucre ¼in. in diameter; ray-florets blue, ligulate, exceeding the involucre; scapes slender, simple, 2in. to nearly 12in. long. Summer. *l.* from obovate to cuneate-oblong, obtuse, irregularly toothed, or shortly lobed,

Lagenophora—*continued.*

narrowed into a petiole, usually all under 2in., rarely above 3in., long. Australia.

L. Forsteri (Forster's). *fl.-heads* yellow and purple, small; scape slender, 2in. to 6in. long. *l.* ½in. to 1in. long, obovate or orbicular-oblong, obtuse, crenate toothed or lobed towards the base. New Zealand, 1837. A small, slender, Daisy-like plant.

LAGERSTRÖMIA (named after Magnus Lagerström, of Gottenberg, 1696-1759, a friend of Linnæus). ORD. *Lythrarieæ*. A genus containing about fourteen species of very handsome stove or greenhouse trees or shrubs, natives of tropical and sub-tropical Eastern Asia. Flowers on axillary peduncles, generally constituting panicles or racemes at the tops of the branches. Leaves opposite, entire. Only one or two species are in cultivation; these succeed in a compost of equal parts peat and loam. Throughout the winter months, the only attention needed consists in giving just sufficient water to prevent the soil getting dust-dry. As the spring advances, both the quantity of water and the amount of heat should be increased. Propagated, in spring, by cuttings of small, firm, side shoots, placed in bottom heat.

L. Flos-reginæ (Queen's flower).* *fl.* of a beautiful rose-colour in the morning, growing deeper through the day, until they become purple in the evening, large, from 2in. to 3in. in diameter; petals orbicular, undulated, on short claws; panicle terminal. *l.* oblong, glabrous, dark green. *h.* 50ft. to 60ft. Malay to China, 1792. Stove. SYN. *L. Reginæ*. (B. F. S. 29.)

L. indica (Indian).* *fl.* bright pink, large, very handsome; petals curled, on long claws; panicle many-flowered, terminal. Summer. *l.* roundish-ovate, acute, glabrous. Branchlets acutely tetragonal, nearly four-winged. *h.* 6ft. to 10ft. China, 1816. Stove or greenhouse. (B. M. 405.)

L. i. alba (white). *fl.* pure white, in which particular alone this variety differs from the type, and to which it forms a very pleasing contrast. China.

L. Reginæ (Queen's). A synonym of *L. Flos-reginæ*.

LAGETTA (native name of the genus). Lace Bark. ORD. *Thymelæaceæ*. A genus of two species of elegantly-reticulated trees, native of the East Indies. Flowers few, in loose terminal spikes or racemes, sessile, or shortly pedicellate. Leaves alternate, oblong or broad. *L. lintearia*, the species in cultivation, is a stove evergreen tree, the inner bark of which furnishes the beautiful Lace Bark of commerce. It thrives in a compost of peat and fibry loam. Propagated, in spring, by cuttings of half-ripened shoots placed in sand, under a glass, in bottom heat.

L. lintearia (linen). *fl.* white, with a tubular coloured perianth, a distended tube, and contracted throat. *l.* ovate, acute. *h.* 6ft. Jamaica, 1793. (B. M. 4502.)

LAGUNÆA. Now included under **Hibiscus** (which *see*).

LAGUNARIA (a name given on account of its similarity to *Lagunæa*, a genus now included under *Hibiscus*, and which is so called in honour of Andres de Laguna, a Spanish botanist, 1499-1560). ORD. *Malvaceæ*. A small genus (two species) of greenhouse evergreen trees, one of which is from Norfolk Island, and the other from Eastern Australia. Flowers large, rising singly from the axils of the leaves. Leaves entire, lanceolate. The undermentioned is probably the only species in cultivation. It thrives best in a compost of peat and loam. Propagated by cuttings of half-ripened shoots, placed under glass, in a gentle heat, during May.

L. cuneiformis (wedge-shape-leaved). A synonym of *Fugosia cuneiformis*.

L. Patersonii (Paterson's). *fl.* pale red, or nearly white, large, solitary, axillary. Summer. *l.* lanceolate-oblong, quite entire, covered with whitish scales beneath. *h.* 20ft. Norfolk Island, 1792. (B. M. 769, under name of *Lagunæa Patersonia*.)

LAGURUS (from *lagos*, a hare, and *oura*, a tail). Hare's-tail Grass. ORD. *Gramineæ*. A monotypic genus, distinguished by the inflorescence being in round spike-like panicles, and the scarious glumes ending in a long fringed bristle The species is one of the handsomest

Lagurus—*continued.*

of British grasses. It is a hardy annual, and thrives best when sown in pots during August and September, wintered in a cold frame or greenhouse, and planted out in the open the following spring.

FIG. 372. LAGURUS OVATUS.

L. ovatus (ovate).* *fl.*, spike ovate, many-flowered, woolly. June to September. *l.* lanceolate, acute, ribbed, downy on both sides; sheaths inflated, ribbed, very downy. Culms about 1ft. high, erect, round. Mediterranean region, West Coast of Europe, Channel Islands. See Fig. 372. (Sy. En. B. 1712.)

LALAGE. Now included under *Bossiæa*.

LALLEMANTIA (named after J. E. Lallemant, of the Botanic Garden at St. Petersburg). ORD. *Labiatæ*. This genus contains about four species of annual or biennial, glabrous or canescent herbs, natives of Asia Minor, &c. Flowers blue, small; whorls axillary, commonly six-flowered; calyx erect. Leaves, lower ones on long petioles, toothed; superior and floral ones narrower, and more sessile and entire. The only species yet introduced is the one here described. For culture, *see* **Dracocephalum.**

L. canescens (hoary). *fl.* blue, whorled; bracts oblong, ciliated; calyx striated, pubescent; tube of corolla longer than calyx. July and August. *l.*, lower ones narrow, on long petioles; upper and floral ones sessile, shortly narrow at the base, all obtuse. *h.* 1½ft. Orient, 1711. Hardy biennial. SYN. *Dracocephalum canescens*. (S. B. F. G. 38.)

LAMARCKIA (named after J. B. Lamarck, 1744-1829, the great French naturalist). SYN. *Chrysurus*. ORD. *Gramineæ*. A monotypic genus. The species is a pretty, many-stemmed, low, annual grass, generally included by seedsmen in collections of ornamental grasses. It thrives when sown in spring, in the open border, but attains a larger size if treated as recommended for **Lagurus** (which *see*).

L. aurea (golden).* *fl.*, inflorescence in simple crowded panicles; spikelets stalked, two-flowered, one fertile and the other sterile, South Europe and North Africa.

LAMBERTIA (named after A. B. Lambert, 1779-1825, a distinguished patron of botany). ORD. *Proteaceæ*. A genus containing eight species of greenhouse evergreen shrubs, endemic in extra-tropical Australia. Flowers red or yellow, usually long, solitary or seven together, sessile within an involucre of imbricate coloured bracts. Leaves mostly in whorls of three, rarely of four, or sometimes scattered at the base of luxuriant shoots, entire, or with spinescent teeth. Lambertias thrive in a compost of sandy peat and fibry loam. Ample drainage must be given. Propagated by cuttings of young and rather firm shoots; or by seeds, sown in slight heat.

L. formosa (beautiful).* *fl.*, involucres terminal, usually solitary, seven-flowered; inner bracts narrow, silky-pubescent outside;

Lambertia—*continued.*

outer ones short and ovate. June to August. *l.* linear or slightly linear-cuneate; margins recurved, contracted into a very short petiole, rigid, shining above, pale or almost ferruginous beneath. 1788. A tall shrub. (A. B. R. 69; B. R. 523; L. B. C. 80.)

LAMBERT'S FILBERT. *See* **Corylus tubulosa.**

LAMB'S LETTUCE. *See* **Corn Salad.**

LAMINA. Generally applied to the blade of a leaf.

LAMIUM (the old name used by Pliny, probably from *laimos*, a throat, on account of the shape of the corolla). Dead Nettle. Including *Galeobdolon.* ORD. *Labiatæ.* This genus comprises about forty species of annual or perennial hairy herbs, decumbent at the base, natives of Europe, North Africa, and extra-tropical Asia, and distinguished either by the long arched upper lip, or by the smallness of the lateral lobes of the lower lip, of the corolla. Leaves always stalked, ovate or orbicular, and toothed. The species are of no great horticultural value, and perhaps the only ones worth mentioning here are the following:

L. Galeobdolon (Galeobdolon). *fl.* yellow, large, in six to ten-flowered whorls. May and June. *l.* ovate, acuminate, doubly crenated or serrated. Rootstock short, stoloniferous. Europe (Britain), West Siberia. Perennial. (Sy. En. B. 1085.) There is a pretty garden variety with golden-bronzy leaves, useful for rockwork or rustic borders.

L. maculatum (spotted).* *fl.* usually purple, large; corolla throat suddenly dilated. June to September. *l.* cordate, crenate or serrate, wrinkled, with a medium white stripe. A pretty dwarf-growing, free-flowering, border plant. Europe, North Africa, North and West Asia. Naturalised in some parts of Britain. Perennial. (Sy. En. B. 1087.) A form of this (*aureum*), with golden-coloured foliage, is useful as a rock or border plant, and also for spring bedding.

LAMOUROUXIA (named after J. V. F. Lamouroux, 1779-1825, a naturalist and professor at Caen). ORD. *Scrophularineæ.* A genus comprising eighteen species of erect, decumbent, or sub-scandent, greenhouse perennial (or rarely annual) herbs, natives of Mexico, Central, and the mountains of South, America. Flowers scarlet or rosy, showy, axillary, or in terminal spikes or racemes; corolla with a short tube, a long, ventricosely compressed throat, and a bilabiate limb. Leaves opposite, toothed or rarely entire, or dissected. It is doubtful if any of the species are now in cultivation; and, as they are probably all more or less root parasites, it is hardly likely they would remain long in gardens after being introduced.

LAMPROCOCCUS. This genus is now included, by Bentham and Hooker, under *Æchmea.*

LANARIA (from *lana*, wool; perianth velvety on the outside). SYNS. *Argolasia, Augea.* ORD. *Hæmodoraceæ.* A monotypic genus. The species is a very pretty little greenhouse herbaceous perennial, of easy culture in a compost of sandy loam and peat. It should be allowed an abundance of water. Propagated by divisions of the root.

L. plumosa (feathery). *fl.* white, woolly; perianth six-parted, spreading; scape angular, corymbose. May. *l.* few, linear, keeled, smooth. *h.* 1½ft. Cape of Good Hope, 1787.

FIG. 373. LANCEOLATE LEAF, WITH SERRATED MARGINS.

LANCEOLATE. Lance or spear-shaped; narrowly elliptical, tapering to each end. A Lanceolate leaf, with serrated margins, is shown at Fig. 373.

LAND CRESS. *See* **Cress, American** or **Land.**

LANDOLPHIA (named after M. Landolphe, who commanded the West African expedition, to which P. de Beauvois was attached as botanist). ORD. *Apocynaceæ.* A genus comprising about sixteen species of stove scandent shrubs, natives of tropical and Southern sub-tropical Africa and Madagascar. Flowers often rather large; corolla white or yellowish, salver-shaped, with narrow contorted lobes; cymes terminal, sometimes densely tomentose, sometimes loosely thyrsoid-paniculate. Leaves opposite, penniveined, and reticulated. From the species of this genus caoutchouc is largely obtained. *L. owariensis* thrives in a well-drained fibry loam, and cuttings root readily in bottom heat. Several other species besides *L. owariensis* have been introduced to Kew, and distributed to the various British Colonies.

L. owariensis (Owara). *fl.* ½in. long; calyx lobes ovate-rotundate. *fr.* about the size of an orange, with a woody reddish-brown shell, and an agreeable, sweetish acid pulp. *l.* 5in. long, 1¾in. broad, membranaceous. Stems 4in. to 6in. in diameter near the ground.

LANDSCAPE GARDENING. Effective Landscape Gardening is an art which is only acquired by considerable study, taste, and judgment, on the part of persons engaged in its execution. The art has reference chiefly to the laying out of grounds, and the arrangement and planting of trees and shrubs in such a manner as to eventually produce the most pleasing effect, so far as circumstances in individual cases admit. Where natural Landscape does not, to a certain extent, exist, the work of wholly creating it becomes an extensive undertaking, and involves considerably more expense than where an arrangement and improvement, by additional planting, &c., are the only requirements. Landscape gardeners, by profession, are not very numerous, their services being in request principally for laying out new estates; and, as this presents endless difficulties to proprietors, and entails such an enormous amount of work and expense, it is not frequently undertaken. The chances of improvement in Landscape are, however, continually presented, and admit of being executed, by experienced hands, a portion at a time, without materially interfering with the effect of the whole until the work is completed. Definite ideas are absolutely necessary, and no attempt should be made at laying out or improving grounds without the fullest consideration being first given, and the results calculated to prove tolerably certain. A few of the main features may be here referred to, but their application must not be taken as always applicable, so much depending on individual requirements, locality, natural disposition of land, the beauty of existing scenery, and many other points which have to be kept in view. The selection of trees and shrubs for permanent positions should be restricted to such as are known to be perfectly hardy, and adapted to the soil of the locality. Doubtful ones may be tried for giving a variety, but they should be kept in positions where provision can be made for substituting something else in the event of failure. Tall-growing trees must be kept in the background, in the case of an extensive piece of undulating scenery, dwarfer specimens and irregular belts of shrubs being introduced in the front. A large space, and an open expanse of lawn or ordinary grass, is best suited for producing a Landscape effect, the eye passing from the foreground amongst and over trees and shrubs of a moderate height, either isolated or grouped, to an irregular background of various trees behind. The work of devastation amongst trees, when alterations are taking place, requires most careful studying before being carried out, or distinct and fine specimens of historic interest may be ruthlessly destroyed, and their place taken by something far removed, in reality, from the aim of improvement in view. Spring and summer are the best seasons for noting where improvements can be made, as the different forms of foliage and the way they

Landscape Gardening—*continued.*

contrast, the preponderance of one sort of tree and the absence of others, the proportion of deciduous and evergreen subjects, any obstructions that may be seen to hide fine specimen trees, avenues, or other permanent objects it is desired should be fully exhibited, may each and all be more readily seen when the leaves are fully expanded. Any defects noticed in this way may be committed to memory or paper, with a view to effecting a remedy, at the proper season, by cutting away, or by replenishing in places where deficiencies occur. Planting should further be conducted so as to prove effective, more or less, at all seasons; the introduction of trees for spring flowering receiving due attention, also others for autumn foliage, and a distribution of conifers or evergreen subjects, so as to avoid a patchy appearance in winter, resulting from the arrangement of the deciduous and evergreen kinds in too much of an alternate order. Spring-flowering trees and shrubs present a much finer appearance in Landscape when there is a good background; and, as few of them exceed a height of 20ft., such positions may generally be secured. The following, named in their usual order of flowering, are amongst the most noteworthy and conspicuous: Almonds, *Prunus divaricata, P. Myrobalana*, Amelanchiers, *Pyrus baccata, P. floribunda, P. spectabilis, Cerasus serrulata, Magnolia conspicua*, and its variety *Soulangeana*, Berberries, Lilacs, Laburnums, Hawthorns, Rhododendrons, and hardy Azaleas. Trees having divided leaves should be placed in prominent positions, as they are specially ornamental in summer; examples are *Ailantus*, Black Walnut, and *Robinia*. Those with white, yellow, or dark-coloured foliage are very telling from a distance, when judiciously placed, notably White Poplar, Golden Oak, and Purple Beech, amongst others. Of trees specially noteworthy on account of the colours assumed by their leaves in autumn, the scarlet Oak and Liquidambar may be mentioned. These are very fine in contrast with others having yellow or brown foliage, such as the Elm, Beech, Plane, Lime, and Hornbeam. The Lime and Horse Chestnut are, perhaps, two of the best trees for isolated clumps, their natural symmetrical habit causing the lower branches eventually to touch the ground, if protected from cattle, and left unpruned. Planting for immediate effect can rarely be practised to any great extent, on account of labour and expense; consequently, the future appearance and results of Landscape Gardening depend on the judgment exercised in the first instance, by disposing of the space and material at command to the best advantage. In a comparatively small space, the grouping of trees and shrubs, and the provision of a piece of open lawn in front, is specially recommended, so far as circumstances admit, in preference to a promiscuous arrangement of the former in all directions, and the cutting-up of the grass in consequence.

An important feature in the production of Landscape effect, wherever it can be obtained, is a broad stream or lake of ornamental water. In many places, where there are an extensive park and pleasure grounds, a running stream is already present, or, by diverting its course, such a valuable addition to the surroundings may be obtained from a neighbouring source. The course of the stream should be rendered irregular in width and outline, so as to present as natural an appearance as possible. An island, or a piece of land projecting from the edge into the water, judiciously planted with trees, near the points where the stream appears and disappears, will greatly heighten the effect produced. Water Lilies, and other aquatic plants, may be introduced to the shallow parts near the margin; and Alders, Willows, and Birch are specially adapted for planting on islands, or anywhere by the side of water.

The foregoing must only be taken as general remarks on gardening in connection with Landscape: peculiarities

Landscape Gardening—*continued.*

which abound in almost every case can only be dealt with individually. *See also* **Garden.**

LANIPILA. A synonym of **Lasiospermum** (which *see*).

LANKESTERIA (named after Dr. E. Lankester, a distinguished British botanist). ORD. *Acanthaceæ*. A small genus (three species have been described) of tall stove evergreen herbs. Flowers yellow or red, sessile in the axils of the bracts, solitary or fasciculate, densely spicate; bracts ovate or lanceolate, often imbricate. Leaves entire. For culture, *see* **Eranthemum.**

L. Barteri (Barter's). *fl.* primrose, orange-eyed, salver-shaped, in terminal, simple or compound spikes. *l.* ovate-oblong, acuminate. West Africa. Stove. (B. M. 5533.)

L. hispida (hispid). *fl.* yellow; spikes short, axillary, and terminal; calyx hairy. September to November. *l.* obovate, acuminated, undulated, hairy. Branches villous. *h.* 1ft. Sierra Leone. SYNS. *L. longiflora, L. parviflora.* (B. R. 1846, 12, under name of *Eranthemum hispidum.*)

L. longiflora (long-flowered). A synonym of *L. hispida.*

L. parviflora (small-flowered). A synonym of *L. hispida.*

LANSBERGIA. A synonym of **Trimezia** (which *see*).

LANTANA (an old Italian name for the Wayfaring-tree). ORD. *Verbenaceæ*. A rather large genus (about fifty species have been enumerated) of stove evergreen shrubs or herbs, for the most part natives of the warmer regions of the New World, a few African and Asiatic. Flowers red, golden, white, or various-coloured, in pedunculate axillary heads; corolla tube slender, with a spreading five-lobed limb. Leaves opposite, dentate, often rugose. The large number of hybrid forms (one is re-

FIG. 374. HYBRID LANTANA, showing Inflorescence and detached Flower.

presented in Fig. 374) now in cultivation are extensively employed for greenhouse decoration and for bedding-out purposes. They are of comparatively easy culture, and produce an abundance of flowers for six or seven months out of the year, many of which are very pretty, but not by any means agreeably scented. Lantanas thrive best in a compost of two parts of good loam, and one part of leaf mould or decayed manure. They require potting moderately firm. Propagated, in August or September, by cuttings, which should be placed in small pots, and wintered in an ordinary greenhouse. In March, they should be shifted into 3in. pots, and, when the side shoots are large enough, stopped back, the points being struck in a gentle bottom heat. If it is desired to have large plants, those stopped back should be repotted into 6in. pots. Plenty of water will be necessary while they are growing freely. Young plants grow and flower well outside in summer; old ones, cut back and repotted, are best suited for culture

Lantana—*continued.*

inside, their growth being shorter-jointed and more floriferous. All the species mentioned below are sub-shrubs or shrubs.

L. aculeata (prickly). A synonym of *L. Camara.*

L. annua (annual). A synonym of *L. trifolia.*

L. Camara (Camara). *fl.* red, orange, varying in colour in different plants; spikes hemispherical. June. *fr.* a roundish berry, black when ripe. *l.* opposite, ovate or oblong, pointed, as long as the peduncles, serrate. Stem prickly. *h.* 6ft. to 10ft. Jamaica, 1692. (B. M. 96, under name of *L. aculeata.*)

L. crocea (copper-coloured). *fl.* bright red, yellow in the centre of the clusters, which are axillary, on long peduncles. June. *l.* opposite, ovate, acute, somewhat recurved wrinked and rough. *h.* 3ft. Jamaica, 1818. (P. M. B. x. 53.)

L. nivea (snowy). *fl.* white, in hemispherical spikes. July to October. *l.* opposite, ovate-lanceolate, acuminate, decurrent at base, having a powerful odour like that of Ground Ivy, but stronger. Stem prickly. East Indies. (B. M. 1946.)

Lantana—*continued.*

rich yellow self, medium truss, very free; NE PLUS ULTRA, rose, pink, and lavender, good; RAYON DE SOLEIL, deep yellow, changing to rosy-violet, large flowers; VER LUISANT, brilliant yellow, large truss, dwarf; VICTOIRE, pure white, rich lemon eye.

LAPAGERIA (named after Josephine Lapagerie, afterwards Empress of the French, who was an ardent botanist). SYNS. *Capia, Phœnocodon.* ORD. *Liliaceæ.* A monotypic genus, the species being a tall, hardy or nearly hardy, climbing shrub. Lapagerias rank amongst the most beautiful greenhouse climbing plants in existence, and are suited equally well for houses of large or small dimensions. They are specially adapted for training over corridors, as here the pendent, waxy flowers are seen to the best advantage. Plants of a good form of the typical species, and others of the chastely pure white variety, have a fine effect, when in flower, if planted alternately, and trained to a roof. Lapagerias succeed

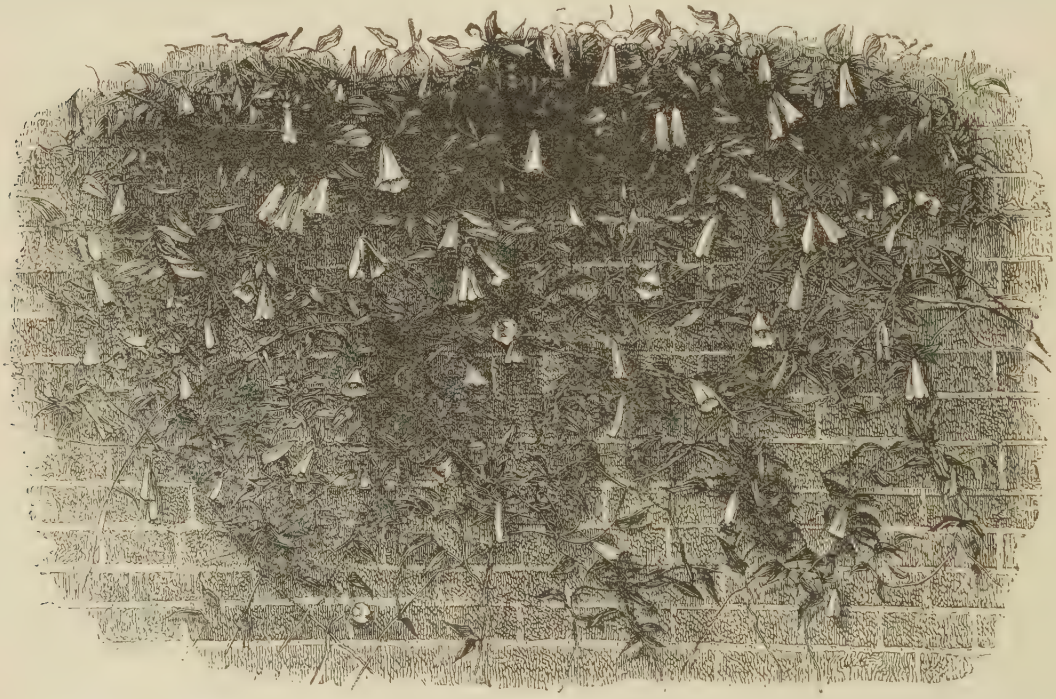


FIG. 375. LAPAGERIA ROSEA.

L. n. mutabilis (changeable). *fl.* at first yellow, gradually becoming rose-colour, borne on prickly peduncles. May and June. (B. M. 3110.)

L. Selloviana (Sellow's). *fl.* bright purplish-red, paler on the outside, arranged in flattish heads. December and January. *l.* opposite, ovate, pointed, crenate-serrated, pubescent on both sides. Stem pubescent, procumbent. Monte Video, 1822. (B. M. 2981.)

L. trifolia (three-leaved). *fl.* reddish or purplish; heads ovoid-globose, at length oblong. August. *l.* elliptical or elliptical-oblong, pointed, cuneate-tapering at base, serrate, often whorled. *h.* 3ft. West Indies, 1733. Shrub. (B. M. 1449.) The plant figured in B. M. 1022 is a young one, and it was then presumed to be annual; hence the name *annua,* there given.

The following is a selection of the best varieties:

BOUQUET BLANC, straw-colour, changing to white, very dwarf habit; DISTINCTION, rich orange-scarlet, good; DON CALMET, pink, changing to yellow, a floriferous and good variety; ELDORADO, white, with lemon eye, dwarf habit; FABIOLA, rose, yellow, and orange, free habit; FAVORITA, yellow, changing to dark brown, shaded purple, good habit; GLOBE D'OR, deep yellow, dwarf; HEROINE, yellow, changing to chocolate, large flowers, good habit; JANUS, deep yellow, changing to rosy-purple, compact habit; LA NEIGE, pure white, very free and dwarf; LOUIS BENOÎT, deep orange-scarlet, dwarf and very floriferous, one of the best; MAGENTA KING, purplish-scarlet, nearly self-coloured; METEOR, pale yellow, changing to rose; MULTIFLORA, on walls and trellises outside, in the warmest parts of the country, and are not injured by a little frost. They may be propagated from seeds, sown, soon after being gathered, in a sandy-peat soil, and kept in a moderate heat. By crossing white and red flowers for raising seed, varieties with flowers intermediate in colour are generally obtained. The most usual mode of propagation is by layers; strong, firm shoots, when layered and covered with soil, producing fine young plants. Where Lapagerias are raised in quantity, beds of suitable soil are prepared, the parent plants placed in them, and the shoots pegged down. A moist medium temperature is maintained; and when young plants are sufficiently established, they are detached and potted.

Cultivation. Lapagerias may be grown in pots, but they succeed much better when planted out in a prepared bed, and their growths trained on a wire trellis. The appearance of a plant in flower, when trained on a wall, is shown in Fig. 375. Important requisites for success in their culture are: thorough drainage, and a start with strong, healthy plants. Weak plants are seldom satisfactory, nor do they become so, in many instances, by

Lapageria—*continued.*

planting out. The soil best suited is three parts good fibry peat to one of loam, and plenty of sharp sand or charcoal should be intermixed. The roots may be inclosed, where space is limited, by slates or a narrow wall, allowing a space of about a square yard inside; otherwise, the crowns spread by their underground stems, and throw up new shoots a considerable distance from where they were originally intended to do so. Young shoots are a special prey for slugs; consequently, the latter should be rigidly excluded, by a band of cotton wool, broken glass, or some other impassable barrier, until the growths are solidified. A cool temperature, and shade in summer, are best suited for the Lapageria, such as a position in a greenhouse or structure devoted to cool flowering subjects. Plenty of water may be given while the plants are growing, and frequent heavy syringings, until the flowers begin opening, are advantageous. Healthy plants, thus treated, flower profusely from the latter part of summer until very late in the autumn.

Insects. The young shoots of the Lapageria invariably become infested with Green Fly in spring. Fumigating lightly, on two successive evenings, is the best remedy, and one that should be immediately applied, or the growths will be crippled. Mealy Bug, Scale, and Thrips, also infest the plants, and must be kept down by syringing and sponging the firm leaves and stems with a rather strong solution of soft-soap.

L. rosea (rosy).* *fl.* rich rosy-crimson, large, pendulous, in the axils of the upper leaves, or at the apices of the branches, solitary or few, produced in great abundance, and remaining in full beauty for several months. *l.* alternate, lanceolate-ovate or subcordate, acuminate, coriaceous, three to five-nerved, and reticulately veined. Chili, 1847. See Fig. 375. (B. M. 4447.) The flowers of this beautiful species vary, in size and substance, on different plants, under cultivation, some being very large and superior in every way to others. Obtaining a good "variety" is an important matter.

L. r. alba (white).* A very beautiful form, with spotless white flowers, thus constituting an admirable contrast to the typical species. Chili, 1854. (B. M. 4892.)

L. r. superba (superb).* Described as a magnificent variety, producing fine large flowers of an exceedingly rich and brilliant crimson colour.

LAPEYROUSIA (named in honour of J. F. G. de la Peyrouse, 1741-1788, the French circumnavigator). SYNS. *Meristostigma, Ovieda,* and *Peyrousia.* ORD. *Irideæ.* A genus comprising about eighteen species of half-hardy bulbous plants, natives of Southern and tropical Asia, allied to *Anomatheca,* but with the spreading lobes more equal, and stigmas more deeply cleft. Flowers on terminal elongated spikes. Leaves sheathing. For culture, &c., *see* **Anomatheca** (which genus is included, by Bentham and Hooker, under *Lapeyrousia*).

L. anceps (two-edged). *fl.*, perianth tube bluish-purple, long, slender; limb hypocrateriform; segments spathulately lanceolate. September. *l.* broadly ensiform, many-nerved, short and blunt; edges more or less curled, and sometimes toothed, rather glaucous, light green; upper ones sheathing the stem. Stem 9in. high, branched, flat. Cape of Good Hope, 1824. (S. B. F. G. 143.)

L. corymbosa (corymbose). *fl.* bright blue, with a white and dark blue angled band encircling the central portion of the perianth; the angles are acute, and extend about half the length of the segments; corymbs several-flowered, clustered, on loose, slender stems. May. *l.* narrow, tapering. *h.* 6in. to 12in. Cape of Good Hope, 1791. (B. M. 595.)

L. fissifolia (cleft-leaved). *fl.* pink or rose, with very narrow tubes 2in. or more in length, fragrant, produced from the axils of the leaves, chiefly near the apex of the stem. August. *l.* tapering, becoming small towards the upper part of the stem. *h.* 6in. Cape of Good Hope, 1809. A very rare species. (B. M. 1246.)

LAPLACEA (named in honour of P. S. de la Place, 1749-1827, the celebrated French mathematician). SYNS. *Hæmocharis, Lindleya* (of Nees), and *Wikströmia.* ORD. *Ternströmiaceæ.* This genus comprises about twelve species of stove trees or shrubs, three of which are natives of the Indian Archipelago, and the rest tropical American. Flowers often sub-sessile, in the axils of the upper leaves. Leaves less coriaceous than in *Gordonia.* For cultivation, *see* **Ochna.**

Laplacea—*continued.*

L. semiserrata (half-serrate). *fl.* white; calyx and corolla silky on the outside. September. *l.* lanceolate, dentately serrated, glabrous. *h.* 30ft. Brazil, 1842. (B. M. 4129.)

LAPORTEA (named by Gaudichaud after his friend M. Laporte). ORD. *Urticaceæ.* A genus comprising twenty-five species of stove perennial herbs, shrubs, or trees, widely distributed throughout the warmer regions of the Old World, a few being natives of extra-tropical North America or Mexico; the genus is quite absent from South America. Flowers monœcious or dicœcious; panicles axillary, solitary, cymose-dichotomous, or rarely reduced to simple racemes. Leaves alternate, often large, dentate, rarely entire, penniveined, rarely three-nerved. Laporteas thrive in a compost of rich loam and fibrous peat or leaf mould. Propagated by seeds; or by cuttings, placed in sand, under a bell glass, in heat. Great care should be exercised in handling these plants, as they possess stinging hairs, which cause acute pain, and the effects last for a long period.

L. crenulata (crenulated). *fl.* dicœcious. *l.* elliptic or ovate, acuminate, cordate at base. Branches unarmed. India. Tree. (B. F. S. 306.)

L. gigas (giant). *fl.* green. *l.* large, broadly-ovate or rotundate, often abruptly attenuate or shortly acuminate at base, cordate, sub-entire, or unequally sinuate-crenate or serrulate. *h.* 80ft. India to Australia, 1874. Tree.

L. Schomburghii versicolor (Schomburgh's various-coloured). *l.* deep green, irregularly mottled with greyish-green, and variegated with patches of creamy-white, large, alternate, having at their base deciduous herbaceous stipules; petioles fleshy, 1½in. to 2in. long, deep wine-purple, which colour is continued along the midrib and principal side veins. Sometimes, the creamy-white marking covers the whole of the leaf surface on one side the midvein. Polynesia, 1875. A handsome ornamental-leaved plant.

LAPPULA. *See* **Echinospermum.**

LARCH. *See* **Larix.**

LARDIZABALA (named after M. Lardizalay of Uribe, a Spanish naturalist). ORD. *Berberideæ.* A small genus (two species have been described) of hardy, or nearly hardy, climbing shrubs. Flowers purple or livid, dicœcious; peduncles axillary. Leaves two or three-ternate; leaflets entire or sinuate-dentate, feather-nerved and subtriplinerved. The only species as yet introduced is a very handsome tall-growing climber. It thrives in a well-drained compost of sandy loam and peat. Propagated by cuttings, made of half-ripened shoots, and inserted in sandy soil, under a glass.

L. biternata (biternate). *fl.* purple, in drooping racemes, axillary. December. *l.* dark green, glossy, twice-ternate; leaflets oblong, acute, unequal at the base. Chili, 1848. This desirable plant reaches perfection only when grown in a conservatory. (B. M. 4501.)

LARDIZABALEÆ. A tribe of *Berberideæ.*

LARGE WHITE CABBAGE BUTTERFLY. *See* **Cabbage Caterpillars.**

LARIX (an ancient name for the Larch, used by Dioscorides). Larch. ORD. *Coniferæ.* A genus comprising about eight species of ornamental, hardy, deciduous trees (formerly included under *Pinus*), natives of the temperate regions of the Northern hemisphere. Flowers monœcious, or male and female on the same plant; male catkins small, without footstalks, egg-shaped; female ones erect, solitary, ovate, much longer than the males. Leaves linear, obtuse, soft, without footstalks, produced singly or in bundles, deciduous. Cones small, oval-obtuse or somewhat cylindrical, consisting of but few scales. Some of the species are extensively grown for their timber, which is valuable for many purposes. For general culture, *see* **Pinus.**

L. americana (American).* Black Larch. *l.* shorter and more slender than in the common Larch. Branches horizontal. *cones* ovoid, ⅜in. to ¾in. long, of few rounded scales. *h.* 70ft. to 90ft. North America (in swamps). A slender tree, with heavy, close-grained wood. SYNS. *Pinus microcarpa, P. pendula.*

L. a. brevifolia (short-leaved). A synonym of *L. occidentalis.*

L. dahurica (Dahurian). *l.* single, or in bundles of many together round a central bud, soft, bright green, narrow-linear, blunt-

Larix—*continued.*

pointed, spreading, recurved, deciduous. Branches distorted and pendulous. *cones* oblong or egg-shaped, ½in. to ¾in. long. Dahuria, &c. A small tree, dwarfing down by climate to a stunted bush; it is, in the Arctic regions of Siberia, one of the last vestiges of arborescent vegetation.

L. decidua (deciduous). A synonym of *L. europæa.*

L. europæa (European).* Common Larch. *l.* linear, soft, blunt, or rounded at the points, spreading, slightly recurved, bright green. Branches spreading, horizontal. *cones* longish-oval, erect, brown, 1in. long, ripening late in the autumn, remaining a long time on the trees; scales persistent, roundish. *h.* 80ft. to 100ft. Europe (at high altitudes), 1629. A fine, quick-growing tree. This splendid species requires an elevated open situation, in which moisture does not linger, and prefers an alluvial sandy loam. The regularity of outline during every stage of growth, which makes it a beautiful object for decoration, has caused it to be frequently employed in situations unfavourable to its natural development, such as close to dwelling or other houses, where there is not sufficient space for it to expand and perfect its full beauty when it assumes a conical form. The Larch, being deciduous, presents a bare appearance after its leaves have fallen; and is, therefore, generally mixed with other trees of an evergreen character. Its leaves are often spoilt by the early frosts, which do plantations of Larch much injury on southern exposures, though no amount of cold appears to affect the tree during winter. It is frequently grown in conjunction with Scotch Pine, though the Oak, perhaps, is its most natural associate, as the latter derives nourishment from a great depth of soil, and is late in being furnished with leaves. The Larch appears to flourish best on steep declivities, or slopes of ravines, where the soil is moist, but where the water runs both off the surface and beneath the ground rapidly. In stagnant moisture, it becomes dwarfed in its growth. SYNS. *L. decidua, L. pyramidalis, L. vulgaris.* Two varieties worth growing are: *glauca*, having decidedly glaucous foliage; and *pendula*, with slender, drooping branches.

L. Griffithii (Griffith's). Sikkim Larch. *l.* longer than those of the common Larch, slightly glaucous when young, spreading, and of a beautiful light green, becoming red in autumn. *cones* large, oblong-cylindrical, without footstalks, blunt-pointed, erect, 2½in. long, 1in. broad, slightly incurved, reddish-purple when young, and abounding in white resin. *h.* 30ft. to 40ft. Bhotan, Sikkim, and Eastern Nepaul. An inelegant, awkwardly-branched tree. Its timber is small, but splits well, and is employed for flooring. (C. H. P. 21.)

L. japonica (Japanese). A synonym of *L. leptolepis.*

L. Ledebourii (Ledebour's). Russian or Archangel Larch. *l.* soft, linear, broad, and rather flat on strong young plants, but on older ones rather four-sided, obtuse, darker green, and with much longer and broader foliage than the common Larch. Branches robust, but not numerous, and pendent. *cones* very small, erect, slender, and rather loose. *h.* 80ft. to 100ft. Siberia. A luxuriant tree.

L. leptolepis (slender-scaled).* *l.* linear, blunt-pointed, soft, spreading at the points, slightly recurved, of a beautiful light green, ¾in. to 1¼in. long. Branches nearly cylindrical, smooth, very spreading, horizontal, and in regular whorls; branchlets slender, mostly drooping. *cones* ovate, rounded, blunt at ends, terminal and numerous on the ends of the small branchlets, remaining on the trees, after the seed is shed, for years; scales numerous, thin, flat, greyish-brown. *h.* 40ft. Japan. This tree is found at great elevations, becoming, at 9000ft., a mere shrub, 2ft. high. SYN. *L. japonica.* (S. Z. F. J. 105, under name of *Abies leptolepis.*)

L. Lyallii (Lyall's). *l.* on branchlets in bundles of forty or fifty, erectly spreading, curved, narrow-linear, blunt-pointed, rather soft, ¾in. long, about a quarter of a line broad; those on young shoots single, and much longer. Branches nearly horizontal; young shoots and buds clothed with cobwebby wool. *cones*, young ones solitary, sessile, 2in. long, 1in. broad; full-sized cones unknown. *h.* 36ft. to 45ft. Rocky Mountains, &c., at great altitudes. A remarkable pyramidal tree.

L. occidentalis (Western).* *l.* on branchlets in bundles of fourteen to twenty, erectly spreading, stiff, narrow-linear, attenuated at base, somewhat obtuse at apex, pale green, ½in. to ¾in. long, three-quarters of a line wide. Branches short; lower ones horizontal or slightly declining; upper ones ascending. *cones* small, solitary, erect, ovate-globose, ¾in. to 1in. long, ¾in. broad; scales orbicular, loosely imbricated. *h.* sometimes 150ft. North-west America (at heights of 6000ft.). A splendid pyramidal tree. SYNS. *L. americana brevifolia, Pinus Nuttallii.*

L. pyramidalis (pyramidal). A synonym of *L. europæa.*

L. vulgaris (common). A synonym of *L. europæa.*

LARKSPUR. *See* **Delphinium.**

LARREA (named after John Anthony de Larrea, a Spanish promoter of science). ORD. *Zygophylleæ.* A very small genus (four species have been described) of greenhouse evergreen shrubs. Flowers yellow; the peduncles inter-stipular, short, terminal, one-flowered. Leaves pinnate, two-lobed or two-parted. For culture, &c., *see* **Zygophyllum.**

Larrea—*continued.*

L. mexicana (Mexican). *fl.* bright yellow. Summer. *l.* sessile, two-foliolate. *h.* 4ft. to 10ft. This species is the Creosote-plant of North-west America; it emits an odour so repulsive that no animal will touch it. The twigs are covered with a resinous substance, of which, it is reported, the Indians make a glue, with which they fasten the heads of arrows to the shaft. It is also used as a remedy for rheumatism.

L. nitida (shining). *fl.* yellow. June and July *l.* impari-pinnate, smooth, clammy, with five or seven pairs of approximate linear leaflets. *h.* 8ft. Buenos Ayres, 1823.

LASIANDRA. A synonym of **Pleroma** (which *see*).

LASIONEMA. A synonym of **Macrocnemum** (which *see*).

LASIOPETALUM (from *lasios*, woolly, and *petalon*, a petal; in reference to the under surface of the petals and leaves being clothed with a rusty indumentum). Including *Corethrostylis.* ORD. *Sterculiaceæ.* A genus comprising about twenty-five species of greenhouse evergreen shrubs, natives of extra-tropical Australia. Racemes few-flowered, rarely cymose-ramose, opposite the leaves or axillary. Leaves alternate, pseudo-verticillate, or rarely almost opposite, entire, dentate, sinuate, or rarely lobed. The species requires similar treatment to that recommended for **Phylica** (which *see*).

L. Baueri (Bauer's). *fl.* white, few, in short, pedunculate, reflexed racemes, rarely branching into cymes. Spring. *l.* on short petioles, linear or oblong-linear, obtuse, mostly 1in. to 2in. long; the margins revolute, coriaceous, glabrous or minutely tomentose above, white or rusty-tomentose beneath. Branches hoary. 1868.

L. bracteatum (bracteate). This is the correct name of the plant described in this work as *Corethrostylis bracteata.*

L. dumosum (straggling). A synonym of *Rulingia hermanniæfolia.*

L. ferrugineum (rusty). *fl.* dark purple, small. June. *l.* shortly-stalked, narrow-lanceolate or oblong-linear. Young branches hoary or rusty with a short tomentum. 1791. A tall shrub. (B. M. 1766).

L. macrophyllum (large-leaved). *fl.* pale green; calycine segments glabrous inside; bracts three, lanceolate-elliptic. May. *l.* ovate-lanceolate or lanceolate, three-nerved. *h.* 5ft. 1835. (B. M. 3908.)

LASIOSPERMUM (from *lasios*, woolly, and *sperma*, a seed; in reference to the woolly texture of the achenes). SYNS. *Lanipila, Mataxa.* ORD. *Compositæ.* This genus comprises four species of perennial, or rarely annual, glabrous herbs, natives of the Cape of Good Hope. Flower-heads small, heterogamous, rayed or disk-formed; ray-florets white or violet; disk-florets yellow. Leaves alternate, pinnatisect. *L. pedunculare*, the only species yet introduced, is a greenhouse or half-hardy plant, thriving in any ordinary garden soil. Propagated by divisions, in spring; or by cuttings, placed under a handlight, in summer.

L. pedunculare (peduncled). *fl.-heads* discoid, marginal flowers minute, tubular. *l.* membranous. *h.* 6in.

LASTHENIA (so called in honour of a Greek girl of that name, who attended the lectures of Plato in man's attire). SYN. *Rancagua.* Including *Hologymne.* ORD. *Compositæ.* This genus comprises about three species of half-hardy, annual, glabrous herbs, two of which are natives of California, and the third of Chili. Flower-heads yellow, on long peduncles, often nodding; involucre oblong or campanulate. Leaves opposite, linear, entire. Only two species are in cultivation, and both are very showy, hardy plants. They grow in any moderately good garden soil, but thrive best in warm, sheltered spots. Seeds should be sown either in September or October, and protected during winter; or in the latter part of April for a summer display.

L. californica (Californian). A synonym of *L. glabrata.*

L. glaberrima (smoothest). *fl.-heads* yellow; involucre about fifteen-toothed; pappus of five to ten firm, chaffy scales. May. *l.* linear, entire, rather succulent. *h.* 1ft. California, 1834.

L. glabrata (smooth).* *fl.-heads* bright yellow, about 1in. across; involucre fifteen-toothed; pappus wanting; achenes mucronate at apex. May to July. *l.* sometimes one-toothed or lobed on each side. Stems branched from the base, glabrous or slightly pubescent. *h.* 9in. to 18in. California, 1834. SYNS. *L. californica, Hologymne glabrata.* (B. M. 3730; B. R. 1780, 1823.)

LASTREA. *See* **Nephrodium.**

LATANIA (its native name at Mauritius is *Latanier*). Bourbon Palm. ORD. *Palmæ*. A small genus (three species have been described) of very handsome stove palms, natives of the Islands of the Mauritius. Flower-spikes branching, sheathed in incomplete spathes, producing males and females on different plants. Stems marked with circular scars, and bearing at the summit a tuft of fan-shaped leaves. The species thrive in a compost of two parts of rich loam and one of peat, to which may be added a small quantity of sand. The drainage must be at all times perfect. Propagated by sowing seeds in a compost similar to that mentioned above, and placing in a moist, gentle heat.

L. aurea (golden). A synonym of *L. Verschaffeltii*.

L. borbonica (Bourbon). *See* **Livistona chinensis.**

L. Commersonii (Commerson's).* *l.* cuneate-flabellate, very deeply incised, gracefully recurved; segments margined with a reddish-chocolate-coloured band, and edged with fine teeth-like spines; petioles long and smooth, of a deep chocolate-red. Stem smooth and slender. *h.* 7ft. Mauritius and Bourbon, 1778. A very handsome and distinct species. SYN. *L. rubra*.

L. glaucophylla (glaucous-leaved). A synonym of *L. Loddigesii*.

L. Loddigesii (Loddiges').* *l.* bright green, with a glaucous hue, palmate, plaited, from 2ft. to 4ft. from point of attachment to the margin, split down about one-third their length into broad segments; petioles from 2ft. to 8ft. in length, stout, spreading, very glaucous-green, slightly tinged with red in young plants. *h.* 10ft. Round Island, 1823. A very large and handsome species. SYN. *L. glaucophylla*.

L. rubra (red). A synonym of *L. Commersonii*.

L. Verschaffeltii (Verschaffelt's).* *l.* flabelliform and roundish, very deeply incised, erect, but somewhat spreading, deep glaucous-green; ribs of a golden colour; petiole smooth, of an orange tint, from 2ft. to 4ft. long. Stem stout. *h.* 7ft. Rodriguez Island. SYN. *L. aurea*. (I. H. 1859, 229.)

LATERAL. Fixed near or upon the side of anything.

LATERALS. The side-shoots that emanate right and left of the leading branch or shoot.

LATHRÆA (from *lathraios*, hidden; on account of the species being found as if hidden under trees and shrubs). ORD. *Orobanchaceæ*. A small genus (three species) of half-hardy, leafless, herbaceous plants, one being found mostly in Western Europe, another broadly dispersed over Europe and Asia, and the third a native of Japan. Flowers white, yellowish, bluish, or tinged with pink, short or long-stalked, ebracteolate; racemes densely spike-formed or loose and few-flowered. Scales on the branchlets sterile, shortly imbricated; those on the scapes erect and scattered. For culture, *see* **Orobanche.**

L. squamaria (scaly).* Toothwort. *fl.* flesh-coloured or slightly bluish, streaked with purple or dark red, numerous and nodding, in a dense spike, or sometimes shortly stalked; corolla half as long again as the calyx. Early spring. Flowering stems erect, 3in. to 12in. high, with a few fleshy scales. Rootstock fleshy, creeping, covered with close-set thick scales. Asia and Europe (Britain), on roots of trees. Plant pale rose-colour.

LATHYRUS (*Lathuros* was the old Greek name for the Pea, used by Theophrastus). Including *Platystylis*. *Orobus*, too, is included, by Bentham and Hooker, under *Lathyrus*; but, as the species are so well known in gardens as *Orobus*, it is kept distinct in this work. ORD. *Leguminosæ*. A genus comprising, according to some authorities, 170 species (which are, however, reduced to 100 by Bentham and Hooker) of, for the most part, hardy climbing herbs, dispersed over various parts of the globe, chiefly in temperate climates or in mountain ranges within the tropics. Flowers blue, violet, rose, white, or yellow, often showy, on axillary, elongated peduncles, solitary or racemose. Leaves pinnate, with one to three pairs of leaflets. As a rule, the species are exceedingly ornamental and very desirable plants. They are of easy culture, thriving in almost any moderately good garden soil. Propagated

Lathyrus—*continued.*

by divisions, made early in spring, in the case of perennial species; or by seeds, sown at the same season, in an open border.

L. amphicarpos (double-fruited). Earth Pea. *fl.* pink, tinged with blue; peduncles one-flowered, longer than the leaves. Summer. *l.* with one pair of lanceolate leaflets; tendrils simple; stipules semi-sagittate. Stems winged, diffuse. *h.* 6in. to 12in. Syria, 1680. A very singular hardy annual, having underground stems, which are whitish, and bear flowers and legumes absolutely perfect, and resembling those on the stems above ground, except that the flowers are smaller, and do not expand. (S. B. F. G. 236.)

L. Armitageanus (Armitage's). A synonym of *L. magellanicus*.

L. cirrhosus (tendrilled). *fl.* rosy-pink; peduncles many-flowered, longer than the leaves. Summer. *l.* with two or three pairs of alternate, elliptic, mucronulate leaflets; stipules semi-sagittate, linear, acute. Stems tetragonal, winged. Pyrenees, &c., 1870. Annual climber. (R. G. 628.)

L. cyaneus (blue). *fl.* blue, pink; peduncles few-flowered, longer than the leaves. May and June. *l.*, leaflets two or three pairs, approximate, linear-lanceolate, acute; stipules equal in length to petiole. *h.* 1ft. Caucasus, 1823. SYN. *Platystilis cyaneus*. (S. B. F. G. 239.)

L. grandiflorus (large-flowered).* *fl.* rose-coloured, very large, with an emarginate vexillum; peduncles two or three-flowered, longer than the leaves. June to August. *l.* with one pair of large, ovate, obtuse, waved leaflets; stipules small, semi-sagittate. Stems tetragonal, winged. South Europe, 1814. Annual climber. (B. M. 1938.)

L. heterophyllus (variable-leaved). *fl.* large, with the standard wings flesh-coloured, and the keel whitish; peduncles six to eight-flowered. July to September. *l.* with one or two pairs of lanceolate, mucronulate leaflets; petioles winged at the base; tendrils branched. Stem erect, rigid, winged. Europe, 1731. Perennial climber.

L. magellanicus (Magellan).* Lord Anson's Pea. *fl.* bluish-purple; peduncles long, many-flowered. June to September. *l.* with one pair of ovate or ovate-oblong leaflets; stipules broad, cordately-sagittate, broader than the leaves; tendrils trifid. Straits of Magellan, 1744. A strong-growing, handsome perennial. SYN. *L. Armitageanus*. (S. B. F. G. ser. ii. 344.)

L. latifolius (broad-leaved). A synonym of *L. sylvestris platyphyllus*.

FIG. 376. PORTION OF FLOWERING STEM OF LATHYRUS ODORATUS.

Lathyrus—*continued.*

L. maritimus californicus (sea-loving, Californian). *fl.* purple, elegantly veined, large; peduncles many-flowered, about equal in length to the leaves. July to September. *l.* glaucous, with four or five pairs of ovate-oblong, glabrous, mucronulate leaflets; tendrils three-parted; stipules semi-sagittate. Stems tetragonal, glabrous. North California, 1826. Perennial climber. (B. R. 1144, under name of *L. californicus.*)

L. Nissolia (Nissolia). *fl.* of a beautiful crimson, variegated with purple and white, solitary, on long peduncles; peduncles articulated at the apex, and downy on the upper part, where they bear two little awl-shaped bracts. May and June. *l.*, petioles dilated, foliaceous, grass-like; stipules small, subulate, usually wanting. Stem erect. *h.* 6in. to 12in. Europe, &c. (Britain). Hardy annual. (Sy. En. B. 398.)

L. odoratus (sweet-scented).* Sweet Pea. *fl.* of various colours, fragrant; peduncles two or three-flowered, much longer than the leaves. Summer. *l.*, leaflets ovate, mucronulate; stipules semi-sagittate, lanceolate. Stems winged. Sicily, &c., 1700. Hardy annual climber. The Sweet Pea is so generally known, and so deservedly popular, that it needs no eulogy here. See Fig. 376. (B. M. 60.) The varieties are numerous, and include the following: BUTTERFLY; FAIRY QUEEN; SCARLET, BLACK, and STRIPED INVINCIBLE; PAINTED LADY; PRINCESS OF PRUSSIA; and VIOLET QUEEN.

L. palustris (marsh). *fl.* variegated with blue and purple; peduncles three to five-flowered, hardly longer than the leaves. Summer. *l.* with two or three pairs of oblong, mucronulate leaflets; petioles subulate; tendrils bifid or trifid; stipules semi-sagittate, small. Stems winged, rather erect. Northern hemisphere (Britain). Perennial climber. A distinct and pretty bog plant. (Sy. En. B. 404.)

L. pratensis (meadow). *fl.* yellow; peduncles many-flowered, twice the length of the leaves. Summer. *l.* with one pair of oblong-linear or lanceolate leaflets; tendrils usually simple; stipules sagittate-ovate. Europe (Britain). Hardy perennial climber. (Sy. En. B. 400.)

L. roseus (rose-coloured).* *fl.* beautiful rose-coloured; peduncles filiform, longer than the leaves. Summer. *l.* with one pair of ovate-roundish leaflets; tendrils very short; stipules small, subulate. Stem slender, not winged. Iberia, 1822. Hardy herbaceous climber.

L. rotundifolius (round-leaved).* *fl.* rose-coloured; peduncles many-flowered, longer than the leaves. May to July. *l.* with one pair of ovate-roundish leaflets; stipules semi-sagittate, or little toothed. Stems winged, branched. Tauria, 1822. Hardy perennial climber. (B. M. 6522.)

L. sativus (cultivated). Chickling Vetch. *fl.* white; peduncles one-flowered, longer than the petioles, bracteolate and articulated at the apex. June and July. *l.*, leaflets linear-oblong; tendrils trifid; stipules semi-sagittate, ovate, ciliated. Stems winged. South Europe, 1640. Hardy climbing annual. (B. M. 115.)

FIG. 377. PORTION OF FLOWERING STEM OF LATHYRUS SYLVESTRIS.

L. sylvestris (wood). *fl.* red, variegated with pale crimson, violet, and tints of green; wings violet; peduncles three to eight-flowered, length of leaves. July to September. *l.* with one pair of lanceolate, attenuated, coriaceous leaflets; stipules very narrow. Stems winged. Europe, &c. (Britain). Perennial climber. See Fig. 377. (Sy. En. B. 402.)

L. s. platyphyllus (broad-leaved).* Everlasting Pea. *fl.* rose-coloured, large; peduncles many-flowered, longer than the leaves. August. *l.* with one pair of elliptic, mucronate leaflets; stipules broad, ovate. Stems winged. Europe, &c. A well-known and very desirable hardy climbing perennial. SYN. *L. latifolius.* (Sy. En. B. 403.) There is a very good white-flowered form of this plant. Both the type and the white variety can be grown with good effect amongst other climbers, over trellises, and in such-like places.

L. tingitanus (Tangiers). *fl.* with a large purple vexillum, and with the wings and keel bright red; peduncles two-flowered, longer than the leaves. June and July. *l.*, leaflets ovate, obtuse, mucronulate; stipules ovate, semi-sagittate. Stem winged. Africa (Tangiers), 1680. Hardy annual. (B. M. 100.)

L. tuberosus (tuberous). *fl.* rose-coloured, large; peduncles three to six-flowered, two or three times the length of the leaves. June and July. *l.* with one pair of oblong-elliptic, rather mucronulate leaflets; stipules semi-sagittate, narrow, acute. Stems tetragonal. Europe, West Asia, North Africa, 1596 (naturalised in Essex). Perennial climber. (B. M. 111; Sy. En. B. 401.)

LATUA (from *Latué*, the native name). SYN. *Lycioplesium.* ORD. *Solanaceæ.* A monotypic genus, the species being a very showy half-hardy, often spiny, shrub. For culture, *see* **Cantua.**

L. venenosa (poisonous). *fl.* rich violet; corolla 1in. long, ½in. broad; tube campanulate; calyx five-fid. February. *l.* elliptic, acute, entire, on short, rather broad petioles, shining, with pubescent or spiny margins. *h.* 4ft. Chili. (B. M. 5373, under name of *Lycioplesium pubiflorum.*)

LAUGERIA. Now included under **Guettarda** (which *see*).

LAUREL. *See* **Laurus.**

LAUREL, CHERRY. A common name of **Cerasus Laurocerasus** (which *see*).

LAURELIA (from *Laurus*, the Bay-tree; in allusion to the similarly-scented aromatic leaves). SYN. *Pavonia.* ORD. *Monimiaceæ.* A small genus (only a couple of species) of tall greenhouse trees, exhaling a powerful aromatic odour when bruised; one is a native of Chili, and the other of New Zealand. Flowers polygamo-monœcious or dioœcious, in axillary cymes or racemes, which are shorter than the leaves. Leaves opposite, coriaceous, entire or serrate-toothed. The undermentioned species is included, by some authors, under **Atherosperma** (which *see* for culture).

L. novæ-zelandiæ (New Zealand). *fl.* in axillary racemes, silky, ¼in. in diameter. *l.* petiolate, 1½in. to 2½in. long, ovate or oblong, obtuse, obscurely serrate. Branches whorled. Trunk (in its native country) 150ft. high, 3ft. to 7ft. in diameter, with buttresses 15ft. thick at the base. New Zealand.

LAURENTEA. Included under **Pectis** (which *see*).

LAURENTIA (named after M. A. Laurenti, an Italian botanist of the seventeenth century). SYN. *Solenopsis.* ORD. *Campanulaceæ.* A genus comprising about ten species of delicate or small greenhouse herbaceous plants, inhabiting the Mediterranean region, South Africa, and North-west America. Flowers bluish, small. Plant sometimes creeping, with filiform branches, or else erect or ascendent, with narrow alternate leaves, and axillary one-flowered or terminal racemose peduncles; sometimes almost stemless, with radical, rosulate leaves, and one-flowered scapes. Several of the species are often erroneously classed under **Lobelia** (which *see* for culture of those described below).

L. erinoides (Erinus-like). *fl.* from the axils of the upper leaves corolla purplish-white, marked with deep purple and two yellow spots, with a campanulate tube and a five-lobed limb. July and August. *l.* glabrous, mostly petiolate; those from the root, and lower stem ones, spathulate; upper ones linear, entire. Cape of Good Hope, 1759. Plant stemless. (B. M. 3609, under name of *Lobelia erinoides.*)

L. minuta (minute). *fl.* pale purplish; scapes ebracteate, erect. June to September. *l.* all radical, ovate. Cape of Good Hope. Plant tufted, stemless. (B. M. 2590, under name of *Lobelia minuta.*)

LAURINEÆ. A natural order of aromatic, sometimes fœtid, trees or shrubs (except *Cassytha*, which is

Laurineæ —*continued.*

a twining herb), natives, for the most part, of tropical regions. Flowers greenish or yellow, small, sometimes minute, often cymose, umbellate, or capitate. Leaves alternate or scattered, rarely opposite, coriaceous and evergreen, rarely membranaceous and annual, often (except *Hernandia*) glandular-dotted, feather-veined, or more or less distinctly three to five-nerved, between the veins often thickly reticulate, undivided or rarely two or three-lobed, the rest entire. *Laurineæ* secrete a pungent volatile oil in the bark and glands of the leaves and flowers. *Laurus nobilis*, a South European tree, is the Victor's Laurel or Sweet Bay, the leaves of which have a pleasant scent and an acrid and aromatic taste; they are used as a flavouring. *Cinnamomum officinale* yields the Cinnamon-bark of commerce. *Camphora officinarum*, a native of China, Japan, and Cochin China, furnishes Camphor, a concrete, volatile, colourless oil, with a penetrating odour, and an acrid but cooling taste. The woods of many of the *Laurineæ* are particularly useful to cabinet-makers and turners, being of a fine and solid tissue. There are about thirty-four genera and 900 species. Well-known examples are: *Camphora*, *Cinnamomum*, *Laurus*, *Persea*, and *Sassafras*.

LAUROCERASUS. Included under *Cerasus.*

LAURUS (the old Latin name of the European species). Laurel. ORD. *Laurineæ.* This much-confused genus comprises but a couple of species of hardy evergreen trees, one of which is from the Mediterranean region, and the other a native of the Canary Islands. Flowers shortly pedunculate, fasciculate or shortly racemose. Berry ovoid. Leaves alternate, feather-veined. The Laurel was called *Daphne* by the Greeks, and was consecrated to priests and heroes, and used in sacrifices. The Bay will succeed in almost any soil. Cuttings inserted under a hand glass, in sandy soil, root readily, if attended to for shade and moisture. Seeds, also, are often produced where plants of the two sexes occur.

L. Benzoin.* *See* **Lindera Benzoin.**

FIG. 378. FRUITING TWIG, INFLORESCENCE, AND FRUITS OF LAURUS NOBILIS.

L. nobilis (noble).* Common Laurel; Sweet Bay-tree. *fl.* yellowish, inconspicuous. Early spring. *fr.*, berries very dark-purple, ripe in October. *l.* oblong-lanceolate, acute, veiny. *h.* 30ft. to 60ft. South Europe, 1562. A well-known, aromatic, evergreen tree or shrub. See Fig. 378. There are two or three unimportant varieties in cultivation, having variegated, curled, and Willow-shaped leaves.

L. Sassafras. *See* **Sassafras officinale.**

LAURUSTINUS. *See* **Viburnum Tinus.**

LAVANDULA (from *lavo*, to wash; in reference to its use in the preparation of Lavender-water).

Lavandula—*continued.*

Lavender. SYN. *Fabricia.* ORD. *Labiatæ.* A genus comprising about a score species of greenhouse or hardy perennial herbs, shrubs, or sub-shrubs, inhabiting the Mediterranean regions, and extending from the Canary Islands to the East Indian Peninsula. Flowers blue or violet, sub-sessile; corolla tube exserted, a little dilated at the throat; limb oblique, bilabiate; whorls two to ten-flowered, in cylindrical simple spikes. Nutlets glabrous, smooth. Leaves often clustered near the base, sometimes pinnatifid-dissected. The species are of easy culture in almost any friable garden soil. Propagation may be readily effected by cuttings of young wood, inserted in free sandy soil, under handlights, in autumn, and planted out during the following spring. The flower spikes of the common Lavender (*L. vera*) are frequently cut and dried, on account of their peculiar lasting fragrance. Cutting, however, should not take place until the flowers are fully expanded. The spikes should be spread and dried slowly, in a cool, shady position, and be then hung up or stored in a dry place. Although the Lavender is possessed of medicinal qualities, which were, at one time, somewhat extensively employed, it is now almost solely grown for the essential oil, which is largely used in perfumery.

L. abrotanoides (Abrotanum-like). *fl.* in dense spikes; corolla bright purple, the upper lip deeply emarginate, the lower with three equal, rounded, entire lobes. *l.* densely crowded, sub-sessile, ovate, deeply bipinnatifid. Canary Islands. A pretty species. (Ref. B. 159.)

L. dentata (toothed). *fl.* dark purple; whorls six to ten-flowered; spikes loose, rather tufted at the apex; calyx oblong, pubescent, about equal in length to the tube of the corolla. Summer. *l.* oblong, linear, or lanceolate, bluntly and pinnately toothed, pubescent, hoary beneath, with revolute edges. Branches ascending, tetragonal, pubescent. *h.* 1ft. to 2ft. South-west Europe, 1597. A pretty shrub, hardy only in warm, sunny situations. (B. M. 400.)

L. pinnata (pinnate-leaved). *fl.* purple, large, in imbricated branched spikes. June. *l.* petiolate; leaflets wedge-shaped. *h.* 1½ft. Madeira, 1777. Greenhouse. (B. M. 401.)

L. Spica (Spica). A synonym of *L. vera.*

L. Stœchas (Stœchas). *fl.* dark purple; whorls six to ten-flowered; spikes dense, comose; calyces ovate, hoary, shorter than the corolla. Summer. *l.* oblong-linear, quite entire, with revolute edges, clothed with hoary tomentum on both surfaces. *h.* 2ft. to 3ft. Mediterranean region, 1568. A handsome, hardy shrub, having a strong, aromatic, agreeable flavour. (S. F. G. 549.)

L. vera (true).* Common Lavender. *fl.* blue, rarely white; whorls six to ten-flowered; spikes somewhat interrupted. Summer. *l.* oblong-lanceolate, somewhat spathulate, quite entire, narrowed a long way at the base, with somewhat revolute margins, hoary on both surfaces. *h.* 1ft. to 2ft. South Europe, 1568. SYN. *L. Spica.* (B. M. Pl. 199.)

LAVATERA (named in honour of two brothers Lavater, physicians of Zurich, and naturalists, who lived in the eighteenth century). ORD. *Malvaceæ.* A genus containing about eighteen species of Old World hardy or half-hardy annuals, biennials, perennials, or shrubby plants, allied to *Malva*, but having the three to six lobes of the involucel coherent about half-way up. Flowers axillary and solitary, clustered, or terminal and racemose. Leaves angled or lobed. The following are the only species worth growing. For culture, *see* **Malva.**

L. arborea (tree-like). Tree Mallow. *fl.* pale purple, 2in. across; pedicels aggregate, axillary, one-flowered. Summer and autumn. *l.* large, on long petioles, five to nine-lobed, crenate. Stem arboreous. *h.* 6ft. to 10ft. Coasts of Europe (Britain). A handsome biennial species, softly pubescent all over. (Sy. En. B. 279.) There is a showy garden form of this (*variegata*) with variegated leaves. See Fig. 379, for which we are indebted to Mr. Wm. Bull.

L. Olbia (Olbia). Tree Lavatera. *fl.* reddish-purple, solitary, on short pedicels. June to October. *l.* soft, woolly, five-lobed; upper ones three-lobed, with the middle lobe elongated; uppermost leaves oblong, almost undivided. Stem shrubby, scabrous. *h.* 6ft. Provence, 1570 (now become naturalised in some parts of Britain).

L. trimestris (three-monthly).* *fl.* rose-coloured; pedicels solitary. Summer. *l.* smoothish, roundish-cordate; upper ones lobed. Stem herbaceous, scabrous. *h.* 3ft. to 6ft. South Europe, Asia Minor, &c., 1633. A common but very beautiful and showy hardy annual. See Fig. 380. (B. M. 409.)

Lavatera—*continued.*

L. unguiculata (claw-petaled). *fl.* lilac, solitary, axillary, on short pedicels, about 3in. across. Summer. *l.* tomentose, acutely five-lobed; upper ones three-lobed. Stem shrubby, tomentose from starry down. *h.* 6ft. South-east Europe, 1807.

LAVENDER. *See* **Lavandula.**

Lavradia—*continued.*

dozen species) of very glabrous stove sub-shrubs, all natives of Brazil. Flowers disposed in terminal paniculate racemes, rarely axillary. Leaves alternate, closely packed, rigid, entire or sub-serrate. The undermentioned species

FIG. 379. LAVATERA ARBOREA VARIEGATA.

LAVENDER, COTTON. *See* **Santolina Chamæcyparissus.**

LAVRADIA (named after the Marquis of Lavradio, a distinguished patron of botany, and once Viceroy of Brazil). ORD. *Violarieæ*. A small genus (about half-a-dozen species) of very glabrous stove sub-shrubs, all natives of Brazil. Flowers disposed in terminal paniculate racemes, rarely axillary. Leaves alternate, closely packed, rigid, entire or sub-serrate. The undermentioned species thrives in a well-drained compost of sandy peat and fibry loam. Propagated by cuttings of ripened shoots, placed in sand, under a bell glass, in heat.

L. montana (mountain). *fl.* deep rose, in crowded racemose panicles. *l.* alternate, almost sessile, obovate, marginate, denticulated, obtuse, ending in a mucrone. *h.* 2ft. to 3ft. 1826.

FIG. 380. FLOWERING BRANCH OF LAVATERA TRIMESTRIS.

LAWN MOWERS. Since the introduction of mowing machines in such variety, and in such a number of sizes, their use has become general, both in large and small gardens, almost to the exclusion of scythes. Machines of various makers differ much more in details of construction than in matters relating to the method of cutting adopted. The general principle is that of fixing a broad horizontal blade, with an edge on the front. This is called the ledger blade, and is kept in position just above the ground, by raising or lowering small rollers on the front of the machine. The cutting blades, which are arranged spirally, revolve by any forward movement, unless provision is made for disconnecting them, and sever the grass on coming into contact with the ledger blade. Revolutions of the cutters are caused by their being connected, usually by cogwheels, to two rollers, generally called drums, at the back of the machine. The spindle passing through this part has a circular cogwheel on one of its ends, sometimes made reversible, and on any forward movement of the drum all the parts are set in motion. In the case of Lawn Mowers drawn by horses, an arrangement is made by which the cutters may be stopped at any time, for conveying the machine short distances, by shifting a movable catch in one end of the drum. The number of cutters varies in different machines, some being placed wide apart, for the special purpose of cutting long grass. The "Archimedean," an American Lawn Mower, was specially noted for this on its introduction, and is now pretty well known. An improved form, manufactured by Messrs. Williams and Co., has all the parts to work either separately or in connection, and the knives revolve very rapidly when in use. The "Excelsior," another Lawn Mower of American make, manufactured by the Chadborn and Coldwell Manufacturing Co., is specially notable for lightness of draught, cutting without ribbing, its easy and novel mode of adjustment, and the complete protection afforded the wheels and mechanism from injury or from clogging with grass, &c. Unlike the adjustment in most other machines, the sole-plate, in this case, is not a fixture, but is advanced to the blades by means of screws, which are turned by an ordinary spanner. Each of the four knives is complete in itself and removable in case of accident. Ransome's "Automaton" is an exceedingly

Lawn Mowers—*continued.*

useful Lawn Mower for general use. It is made in various sizes; those from 12in. to 22in. are recommended. Many of Green's Lawn Mowers are worked by means of a flat-link chain instead of cog-wheels. Some persons object to this, on account of the chain occasionally coming off when on sloping ground. That the machines are durable, and do their work well, is, however, unquestionable. In Shanks's Patent Lawn Mower, manufactured by Alex. Shanks and Son, the sole-plate, or ledger blade, has a double reversible edge, and is thus enabled to last longer than most others. This machine is specially recommended in the size worked by a horse, as it is strong in construction, and has a good delivery of grass into the box, and an admirable system of emptying the latter when full. Edwards' Patent "Invincible" Lawn Mower, manufactured by J. Crowley and Co., is a smooth-working machine with reversible cutters. Regulating rollers can be fixed before or behind the knives, or in both positions, or the machine may be used without any. It makes but little noise when at work; and the mechanism is simple, and easily understood. There are other Lawn Mowers, in quantity far too numerous to mention here, some of which may possibly have an advantage in certain particulars over those referred to above. All the smaller sizes are made so that the grass-box may be easily removed at any time. Some people prefer using the machine without a grass-box; but, if the crop is unduly heavy, this plan does not always answer. It is very important that a machine of any description should be kept clean when not in use, and be cleansed throughout each time after being used. Rust and dirt on the blades are often more destructive than constant wear with cleanliness enforced. The knives should always be made to work quite evenly on the ledger blade, so that a piece of paper may be cut on any part alike. It is not advisable to have the blade too low, as many of the tender grasses are thus cut too close and killed, and the remainder presents an unsightly appearance for a time, until new growth is resumed. Lawn-edge Clippers are small machines made for following the Lawn Mower and cutting the grass along the edges of walks. Some of them are made with a drum roller, which is connected and sets the other parts in motion by every forward movement. In Green's patent machine, the chain and wheel motion is adopted, a fixed blade is guided along the edge, and a cutter, with several edges, revolves against it and severs the grass. Adie's Patent Clipper has blades somewhat like shears, the point of the under one being regulated to run ½in. below the turf level. On applying a downward or forward pressure of a few pounds, the blades open, and, being connected to a strong spring, close suddenly, and, in doing so, perform their intended work. Lawn-edge Clippers are not at present extensively used, the difficulty in guiding them straight, or in following a curved edge, being much against them. The value of such machines, if improved so as to be available for ordinary use, would be very great, as an immense amount of labour, in clipping with hand-shears, would be avoided.

LAWNS. A well-made and properly kept Lawn is always one of the most important features in connection with any garden, especially that surrounding a residence. Where it is improperly levelled and made in the first instance, the defects in the surface caused by holes, or subsidence of the soil in one place more than another, cannot well be satisfactorily remedied. The form and extent of the Lawn will, of course, vary in almost every case; the more it covers, the better will be the effect produced, if the work has been well done; and, on the other hand, the more prominently will any inequalities be seen. Close-cutting machines, now so much in use, cannot dip into holes, consequently the grass here is left comparatively long, while that on the higher portion around is cut

Lawns—*continued.*

shorter than it would be on an even surface. Lawn preparations should be commenced in autumn, and, if the site is not naturally drained, it must be made so artificially, by the insertion of pipes, before anything else is attempted. An undulation, or a gravelly sub-soil, will alone usually insure a sufficient drainage. The various levels of the surface should then be marked, and the whole be dug over a spit deep, and as evenly as possible. If the soil is of fairly good quality, and not very heavy, there will be no difficulty in doing this, or in the formation of the Lawn afterwards. Where it is very poor and sandy, the addition of some that is heavier, and of better quality, will be advisable, as there is a great difference throughout the season in the appearance of Lawns, according to the depth and quality of the soil beneath. This may appear somewhat needless; but the work should be considered as one of a permanent character, and after-results will well repay the extra trouble and expense incurred. The soil, having been thus dug all over alike, should be allowed to remain until spring, if possible, when exposure to rain and frost will have rendered it solid, and in good condition for treading and raking down, in preparation for turf or grass seeds, whichever may have been intended. If good turf can be secured, a Lawn may be made at once. It should be free from coarse grass and weeds, and if the turfs have been cut uniform in thickness and size, they may soon be laid, and the work finished. Some fine light soil should be spread over and brushed in, to fill up all the interstices, and the turf-beater—a tool made specially for the purpose, with a flattened

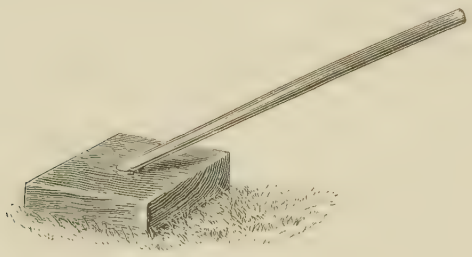


FIG. 381. TURF-BEATER.

wooden head (see Fig. 381)—applied to make a plane surface. It is not advisable to mow too closely the first summer, especially if the season be a dry one.

When recourse is had to grass seeds, they should be purchased from a reliable source, even though the price be higher than that usually paid; spurious stocks being worse than useless, where a piece of fine grass is of first importance, and the mowing machine is to be kept in use. The best season for sowing is in March and April, as the warm sunshine and showery weather then usually experienced is more favourable than any other for the quick germination of the seed. It will be necessary to tread and work the ground all over, the same as for turf, allowing the surface to be the full height required for the Lawn. A verge of turf round the outside is a good guide in preparing a Lawn for grass seeds, as by its height a good deal may be determined with the eye alone in levelling the inside part. The seeds should be sown thinly, on a calm day, and lightly covered by means of a wooden rake; and, when the grass is well up, a heavy roller may be drawn over it before mowing. The next best season to April, for sowing, is the end of August, as the weather is then cooler than in summer, and there is sufficient time for the grass to become established before winter. From 40lb. to 50lb. to an acre is about the quantity of grass seed required for a Lawn;

Lawns—*continued.*

but so much depends on the quality that it is uncertain whether this weight will be always sufficient. Mixtures of strong-growing sorts are prepared and sold separately for sowing under trees. Lawns which become unsightly may be renovated considerably by a covering of about ½in. of rich light soil in autumn or early spring. A similar dressing of two parts loamy soil with one of powdered lime, may be recommended for applying in autumn, or at any time during showery weather, to Lawns covered with moss. Nutriment derived from such dressings by the old grass, and an additional light sowing of new seeds, will tend greatly to bring old Lawns into a much finer condition. Where plenty of water is at command, it may be freely applied in the evening, after dry days, in summer; but mere sprinklings are best left alone. The keeping of Lawns, when once established, is work of a routine character, consisting chiefly of mowing, rolling, and sweeping. All of these operations require frequent attention, particularly in spring and summer.

LAWN SAND. A preparation said to have the power of destroying Daisies, Ribbed Grass, Plantains, Dandelions, &c., in lawns, and, at the same time, improving the quality of the grass. It should be applied in dry weather, evenly, through a dredging box; or about a thimbleful may be put on the centre or crown, varying the quantity according to the size of the weed. The use of Lawn Sand is not here recommended, as, although the crowns of strong weeds may be killed, their tap roots remain alive, form three or four fresh crowns in due course, and eventually grow with renewed vigour, thus necessitating a second or third application. Wherever Lawn Sand is carelessly applied, the grass becomes burnt up, and very unsightly, in a few hours. Sulphate of ammonium, which can be bought for 4d. per lb., has much the same effect.

LAWSONIA (named after Dr. Isaac Lawson, a botanical traveller, who published an account of a voyage to Carolina in 1709). SYN. *Alcanna.* ORD. *Lythrarieæ.* A monotypic genus, the species being a stove tree. It thrives in a compost of sandy peat and turfy loam. Propagated by cuttings of ripened shoots, placed in sand, under a glass, in heat.

L. alba (white). Henna Plant. *fl.* white, small, sweet-smelling, disposed in panicles. *l.* opposite, lanceolate, quite entire. *h.* 6ft. to 10ft. Northern Africa, Arabia, Persia, and India, 1752. SYN. *L. inermis.*

L. inermis (unarmed). A synonym of *L. alba.*

LAX. Loose; not compact.

LAXMANNIA (named after E. Laxmann, 1737-1796, a Siberian traveller). ORD. *Liliaceæ.* A genus comprising eight species of greenhouse perennials, with fibrous roots, confined to Australia. Flowers white or pink, in terminal, pedunculate or sessile heads, with imbricated scarious bracts; perianth persistent, but not twisted, of six segments. Leaves narrow-linear or subulate, in radical or terminal tufts, dilated at base into scarious, sheathing appendages, which are often produced into bristles. Stems short and tufted, or elongated, branched, and diffuse. The species require a compost of loam and peat. Propagated by divisions. *L. gracilis* and *L. grandiflora* are probably the only species introduced.

L. gracilis (slender). *fl.* pink, very shortly pedicellate, or almost sessile; heads small, on slender peduncles of several inches. June. *l.* crowded at bases and ends of branches, the short, broad, sheathing bases imbricate, with a few woolly hairs on their margins; the blades filiform, erect or spreading, ½in. to 1in. long. Stems slender, branched, forming loose tufts of 1ft. or more. 1824.

L. grandiflora (large-flowered). *fl.* one, two, or three within each bract; outer segments of perianth often very white; outer empty bracts scarious, with brown centres; peduncles 6in. to 10in. long. June. *l.* crowded, 1in. to 2in. long, the scarious sheaths terminating in long fringed bristles. Stems tufted when old, densely and shortly branched.

LAYERING. Layering is a method of propagation by means of which plants are rooted and increased while still fed by the parent. It is a most useful plan for propagating plants that do not succeed when wholly detached as cuttings. Sap flows through branches by the alburnum, and youngest layers of wood, to the leaves, and then returns by the inner bark, forming woody matter in its progress. The principle on which Layering is founded, is that of causing the returning sap to form roots at a certain place, of suitable texture, in the stem, and so constitute a separate and independent plant, which may afterwards be detached, and utilised for perpetuating the species. In some cases, roots are readily emitted from almost any firm portion of a branch, by merely fixing it and covering with soil. Generally, however, it is necessary to partially interrupt the course pursued by the sap, in order to induce it to form other roots, instead of returning to those of the parent plant. With this principle in view, various modes of Layering are practised, according to circumstances, and the sort of plant under treatment. The principal methods adopted are: Layering by simply Bending and Pegging the branch into the earth, Tongueing or Heeling, Ringing, Wiring or Strangulation, Twisting, Piercing, Serpentine Arching, and Insertion of the Growing Point.

Layering by simply Bending into the earth is very easy, and plants are readily propagated when it succeeds. All buds should be removed from the shoot, except a few near the top, which are intended for forming leaves. The part covered with soil should be secured with a peg, and the point bent in an upright direction, and tied to a stake.

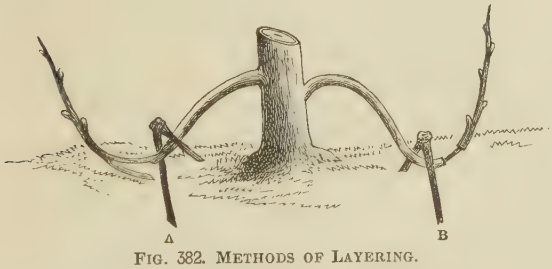


FIG. 382. METHODS OF LAYERING.
A, By Tongueing or Heeling. B, By Ringing.

Tongueing, or Heeling, is a method largely practised, with much success. It consists of cutting the branch half-way through, below a bud, and making an incision (varying in length with different plants) in an

FIG. 383. LAYERING BY TONGUEING OR HEELING.

upward direction towards the point (see Figs. 382, A, and 383). In covering with earth, it is important that the cut

Layering—*continued.*

surfaces be kept separated by some of the soil, or another substance, such as a small piece of wood; otherwise, the parts might unite again, instead of forming roots.

Ringing is a mode represented in Fig. 382, B. The Layer is bent down, and secured with a peg, as in the process of Tongueing; but, instead of the wood being cut, a ring of bark is taken off—in this case, cutting quite through the outer and inner layers, in order to effectually arrest the sap on its return. The peg should be inserted near the place where the ring has been removed, and the latter portion must be well covered with soil, and be kept frequently moistened.

Wiring, or Strangulation, refers to the Layering of branches which have had a wire strained tightly round them, so as to check the sap, and cause an accumulation of woody matter above the wire. Roots are not readily formed on this enlarged portion, when exposed to the air, but they usually appear when it is laid in soil, sometimes very soon. Pricking the bark through with a sharp instrument tends to encourage the production of roots. Tongueing and Ringing are both preferable to this method, where their adoption proves practicable.

Twisting is the same as simply Layering in the earth, excepting that the branch is twisted for the purpose of rending the sap-vessels. Many plants will not bear such treatment without breaking; consequently, it can only be practised in certain cases.

Piercing, like Twisting, refers to another plan of ordinary Layering, and differs only in detail. The branch, in this case, is pierced or punctured with some sharp instrument before being pegged and covered with soil. Clean cuts are always much better than bruises, and, for this reason, the removal of a notch on the under portion

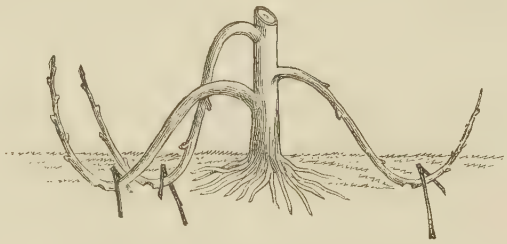


FIG. 384. LAYERING BY PIERCING OR NOTCHING.

of each layer (see Fig. 384) is, of the two, to be preferred.

Serpentine Arching is a method of Layering sometimes adopted for propagating plants with long, firm shoots. The shoot is brought to the ground and Layered in several places by one of the methods previously alluded to. The intervening spaces, or curves of the branch, should be furnished, above ground, with growing buds, so that each portion may ultimately be severed, to form a separate plant.

Layering by Insertion of the Growing Point is sometimes an available method, if others fail, or when roots are not readily emitted. Points of firm shoots, for instance, of scarce varieties of Currants, Gooseberries, or Rubus, if placed and secured in newly-dug soil, in summer, will form a quantity of roots by autumn, and will be furnished with a growing bud. In such cases, this method may be successfully utilised for propagating.

Circumposition is an old term applied to the Layering of plants whose branches are far from the ground, or, for various reasons, will not bend. It is still practised occasionally, but not to any great extent. The branch, in most cases, is either ringed, or has an incision made in it, and this part is placed inside a pot or box and surrounded with soil. An ordinary flower-pot, cut in two before being burned, answers well, as the two parts may

Layering—*continued.*

be placed together, and the branch allowed to enter at the bottom. The pot must be afterwards filled up with soil, and made secure, by some means, from falling apart or shifting about. A covering of moss over the pot tends to keep the soil moist, by preventing an undue evaporation, resulting from its suspension in the air. This is sometimes called the Chinese method of Layering, presumably on account of it being more generally adopted in China.

Some plants—Cordylines, for instance—will form roots readily in a moist stove, if an incision is made in a firm part of the stem, and some moss tied round, without soil. The moss must be kept syringed, and the old roots of the plant somewhat dry, until new ones are formed at the place desired.

Layers should, in all cases, be allowed to become well rooted before being detached.

LAYIA (named in honour of Thomas Lay, naturalist in Beechey's voyage). SYNS. *Eriopappus, Madaroglossa.* Including *Callichroa, Calliglossa,* and *Oxyura.* ORD. *Compositæ.* A genus comprising about a dozen species of hardy, pubescent or hirsute, often glandular, mostly annual herbs, natives of North America. Flower-heads heterogamous, pedunculate; rays yellow or white; disk yellow; achenes pilose or rarely glabrous. Leaves alternate, narrow, entire, or the lower ones rarely all pinnatifid. The species, not many of which have been introduced, thrive in any ordinary garden soil. Propagation may be effected by seeds, sown on a hotbed.

L. Calliglossa (Calliglossa). This differs from *L. chrysanthemoides* principally in having a pappus of usually several (ten to eighteen) unequal, rigid, subulate awns. California. SYN. *Oxyura chrysanthemoides* (under which name it is figured in B. R. 1850).

L. chrysanthemoides (Chrysanthemum-like). *fl.-heads* solitary, on sub-clavate peduncles, tomentose; ray-florets yellow at base, paler at apex, broad-oblong, trilobed; pappus none. August and September. *l.*, lower ones pinnatifid; uppermost ones quite entire; all slightly scabrous on the margin. *h.* 1½ft. California, 1834.

L. platyglossa (broad-tongued). This is the correct name of the plant described in this work as *Callichroa platyglossa.* (B. M. 3719; S. B. F. G. ser. ii. 373.)

LEADWORT. *See* **Plumbago.**

LEAF. A Leaf is an expansion of the cellular tissue of the stem, traversed by fibro-vascular bundles. The use of Leaves is to afford a large surface for exposing to the action of sunlight and heat the food absorbed by the plant, and thus cause assimilation; they also provide for evaporation, and absorb the carbonic acid of the air. The various terms employed in describing the shape, duration, and insertion, &c., of leaves will be found in their proper places in this work.

LEAF BUDS. *See* **Buds, Leaf.**

LEAFLET. One of the divisions of a compound leaf.

LEAF-MINERS. Many plants are liable to have their leaves mined by the larvæ of minute insects, which may belong to various groups—Beetles (*Orchestes Fagi* in Beech-leaves, &c.), Sawflies (species of *Fenusa,* &c.), Lepidoptera (species of *Lithocolletis,* &c.), and Diptera (species of *Phytomyza,* &c.). In general, the affected plants seem to suffer little harm from the existence of the mines, unless these are very numerous. This is fortunate, as the only remedy is to crush the larvæ in the leaf between the finger and thumb—a remedy not suitable for extensive application. *See also* **Celery Fly, Holly-leaf Fly,** and **Parsnip Fly.**

LEAF MOULD. Leaves, when thoroughly decayed, so that they readily separate into small particles, constitute what is termed Leaf Mould, a valuable manure in many instances, especially on heavy soils, and one of the most important ingredients for the soil used in the successful cultivation of the majority of pot plants. If of good quality, and free from injurious fungoid growths, it may

Leaf Mould—*continued.*

be used freely, particularly with tender seedlings and cuttings of soft-wooded subjects. The production of roots, in young plants of this description, is induced and accelerated with more certainty by planting in the material under notice than by the use of any other. The quality of Leaf Mould depends very materially on the sort of leaves composing it, and in the manner of preparation adopted. The best leaves are those collected from a wood, or other place, where the principal trees are Beech and Oak, and where their leaves fall over a large surface each year, and naturally decay slowly until those beneath the surface become changed into a light mould. In many instances, such Leaf Mould cannot be obtained, on account of the necessary removal of the leaves to preserve tidiness; but, on the other hand, its importance and additional value over that artificially prepared is insufficiently recognised in many places where quantities might be collected in woods. Leaf Mould of good quality may be used to the extent of about one-third in composts for Azaleas, greenhouse Rhododendrons, and many fine-rooted hard-wooded plants of this description. It may, with advantage, be freely incorporated along with peat in the preparation of beds for nearly all Ericaceous plants outside. Further, nothing is better suited for improving flower-beds, or for adding to soil of any description for placing round trees, shrubs, or plants, whose roots it is desired to encourage. If leaves have to be gathered into a heap for Leaf Mould, a place should be selected where they may be spread rather thinly, so as to avoid any excessive heating by fermentation. The whole should be turned over occasionally, so as to expose all parts in turn to the influence of the weather and air. Where air cannot reach leaves that are of a somewhat hard, dry texture, their decay is exceedingly slow, unless there are other substances intermixed to hasten decomposition. Water may be applied artificially for the purpose, but it never has the same effect as rain; and if a large heap is made, this latter cannot penetrate far into the interior. Leaves should be collected free from sticks, if possible, as these are liable to encourage fungoid growths, which, finding a suitable medium for increasing in the Leaf Mould, will, in due course, render it useless for plant cultivation. The time taken in reducing leaves to a mould or fine soil depends greatly on the amount of turning over, and other attention devoted to the preparation. Much may be done in one year, or even less; but the quality is usually better if a longer time than this is allowed.

LEAF PROPAGATION. The propagation of plants by their Leaves is a method of rapid increase adopted with great advantage in the case of those which succeed. An incision made in any firm part of the midrib, as well as the petiole, will, in certain instances, induce the production of a young plant. Ornamental-leaved Begonias, Gesneras, Gloxinias, and several succulent plants, are familiar examples of subjects largely increased by Leaf Propagation. Doubtless, many other sorts of plants might be similarly perpetuated, if their leaves remained fresh for a sufficiently long time to enable a callus to form. Leaves which are nearly fully matured, but still not too old, are preferable for propagating purposes; they will not succeed at all if very young. Merely pegging them on light soil, or covering very lightly, for preserving moisture, is generally sufficient, with the protection of a close frame or bell glass. Succulents, increased by Leaf Propagation, should have their fleshy leaves simply laid on or very lightly pressed into sand, and be kept nearly dry on a shelf until a small bulbil-like plant forms at the end of each, where it has been detached. The propagation of plants by leaves is generally limited to the petiole or ribbed portion. *Bryophyllum calycinum* is, however, an exception, as young ones spring, in this case, from the notches on the margin of the leaf.

LEAF-ROLLERS. By this name are denoted the larvæ of insects belonging to several different orders, and all of which may cause considerable injury to the trees and shrubs in gardens. To herbaceous plants they are less hurtful. The larvæ dwell in tubes, formed of the inrolled leaves, and are thus well protected against assaults from without. Many of them have the habit, when the plant on which they live is smartly shaken, of crawling from the leaf-tube, and lowering themselves, by a thread of silk, till the dreaded danger is past, when they pull themselves up by the thread, and re-enter the tubes. Advantage may be taken of this habit to shake them on to a sheet laid below; and from this they can be collected for destruction. The leaf is retained in an inrolled form by means of numerous short cables of silk, passing from surface to surface of the roll. Sometimes, the silk is fixed before the leaf has opened originally; but, in other cases, the larvæ have been seen at work fixing the threads and drawing the leaf into position. In the smaller proportion of cases, the inrolling of the leaf is due to swelling on one surface, brought about by the irritation caused by the action of the indweller or indwellers. The damage done may be confined to suction of the tissues in the interior of the tube, or these parts may be eaten away, and the leaf may thus be killed. The leading forms of Leaf-rollers are: (1) Moths, for the most part belonging to the group of Tortrices. The insects seldom reach 1in. in spread of wings; but they are at times so numerous as to more than make up for their small size individually. Their wings are generally rather broad, and are usually dark or some shade of brown. Some species almost strip trees of their foliage, *e.g.*, *Tortrix viridana* on Oaks. (2) The leaves of several of the cultivated Willows have the margins rolled in to form tubes, the agents being larvæ of Sawflies of the genus *Nematus*, or else Gall-midges, belonging to the *Cecidomyidæ*. (3) Certain Mites also, of the genus *Phytoptus*, roll the margins of the leaves of some kinds of plants, so as to form narrow tubes, in which they live for protection. Few cultivated plants have the leaves rolled by these Mites; though Hawthorn and Sloe occasionally have their leaves a good deal injured in this way.

LEAFSTALK. The (unexpanded) base of a leaf, connecting it with the stem.

LEAFY. Covered more or less with leaves; of the consistency of a leaf.

LEATHER JACKET. A common name for the grub of the **Crane Fly** (which *see*).

LEATHER-WOOD. *See* **Dirca palustris.**

LEAVENWORTHIA (named in honour of M. C. Leavenworth, an American botanist, who died in 1862). ORD. *Cruciferæ*. *L. Michauxii* thrives in any ordinary garden soil, and succeeds best when treated as a half-hardy annual. Propagated by seeds, sown in the open border, in spring.

L. aurea (golden) is quoted by Dr. Asa Gray as a mere synonym; it is described, however, as having yellow flowers, so would be a desirable variety, from a garden standpoint.

L. Michauxii (Michaux's). *fl.* rosy-lilac, with a yellow eye, freely produced on erect scapes. June. *l.* slender, lyrately-pinnatifid, tufted. *h.* 3in. United States, 1868. (B. M. 5730.)

LEBANON, CEDAR OF. *See* **Cedrus Libani.**

LEBECKIA (said to be derived from the native name of some of the species). ORD. *Leguminosæ*. A genus containing about twenty-four species of greenhouse shrubs, all natives of Southern Africa. Flowers yellow, in terminal, often unilateral racemes; bracts and bracteoles small and inconspicuous. Leaves linear-filiform, one to three-foliolate. Branches unarmed, slender, or much-branched and spinescent, glabrous or silky. Perhaps the

Lebeckia—*continued.*

only species now in gardens is *L. cytisoides*. Some of the plants formerly included here are now placed under *Aspalathus*, &c. For cultivation, *see* **Aspalathus.**

L. cytisoides (Cytisus-like). *fl.* bright yellow, large, on spreading longish pedicels. May. *l.* long-stalked, trifoliolate; leaflets linear-oblong, silky, canescent. *h.* 2ft. to 4ft. (B. M. 1699, under name of *Crotalaria pulchella*).

LEBRETONIA. Included under **Pavonia** (which *see*).

LECANIUM. Included under **Trichomanes** (which *see*).

LECANOPTERIS. Included under **Polypodium** (which *see*).

LECHENAULTIA. *See* **Leschenaultia.**

LECYTHIDEÆ. A tribe of *Myrtaceæ*.

LECYTHIS (from *lecythos*, an oil-jar; in allusion to the shape of the seed-vessels). ORD. *Myrtaceæ*. A large genus (sixty-four species have been described, but not so many are entitled to specific rank) of stove trees, sometimes very large. They are confined to tropical—mostly Eastern—America. Flowers often rather large, disposed in simple or paniculate, axillary, terminal racemes; calyx segments and petals six, rarely four, the former imbricated. Fruit coriaceous or woody, globular or cupuliform, furnished at top with a lid, which falls off when the fruit is ripe. Leaves alternate, coriaceous, entire or serrate, dotted. Few of the species are known to cultivation. They thrive in a mixture of loam and sand, and require a strong heat. Propagation may be effected by cuttings of the ripened wood, inserted in sand, under a glass. Under the name of Sapucai Nuts, the seeds of *L. Zabucajo* are sold in our shops as a substitute for Brazil nuts, to which they are far superior.

L. grandiflora (large-flowered). *fl.* 2in. in diameter; petals deep red, very hard; pedicels thick, shorter than the largest petal. April. *fr.* ovate, nearly globose, 4in. to 5in. in diameter; seeds edible and very palatable. *l.* petiolate, oval, acute, quite entire, stiff. *h.* 60ft. to 80ft. Cayenne, 1824.

LEDEBOURIA. Included under **Scilla** (which *see*).

LEDENBERGIA (a commemorative name). ORD. *Phytolaccaceæ*. A monotypic genus, the species being a very ornamental-leaved stove climbing shrub. It thrives in a compost of rich loam and leaf mould, and requires ample drainage and plenty of pot room. Propagated by cuttings, placed in sandy loam, under a hand glass, in gentle bottom heat.

L. roseo-ænea (rosy-bronze). *fl.* whitish, small, inconspicuous, disposed in long, drooping, axillary racemes. *l.* large, alternate, thick, obovate-lanceolate, dark shining coppery-green on the upper surface, and bright rosy-violet colour beneath. Stems and branches reddish-purple. Central America, 1869. (I. H. 591.)

LEDOCARPUM. A synonym of **Balbisia** (which *see*).

LEDUM (from *Ledon*, the ancient Greek name used by Dioscorides for the Cistus). Labrador Tea. SYN. *Dulia*. ORD. *Ericaceæ*. A small genus (four or five species) of very ornamental, dwarf, hardy evergreen shrubs, inhabiting the Frigid and Arctic regions of the Northern hemisphere. Flowers white, disposed in many-flowered terminal umbels; petals five, obovate, obtuse, spreading; stamens five or ten, rarely six or seven, exserted; pedicels bracteate at base. Leaves alternate, shortly petiolate, linear or oblong; margins recurved, entire, rusty underneath, coriaceous. Like most other so-called American plants, the species succeed best in well-drained beds of peat and leaf mould, to which sharp sand or road grit should be added. Propagated by seeds, but principally by layering, in sandy-peat soil, and by careful divisions of established plants in autumn and winter. Raising and establishing young plants takes some considerable time to accomplish. When transplanting Ledums, it is necessary to keep the ball of earth surrounding the roots as intact as possible.

Ledum—*continued.*

L. buxifolium. *See* **Leiophyllum buxifolium.**

L. canadense (Canadian). A synonym of *L. latifolium canadense.*

L. glandulosum (glandular). *fl.* white; inflorescence often compound and crowded calyx five-parted. *l.* oblong or oval, or approaching lanceolate, pale or whitish, and minutely resinous-dotted beneath. *h.* 2ft. to 6ft. North America.

L. latifolium (broad-leaved).* *fl.* white; stamens five, about the length of the corolla. April and May. *l.* linear-oblong, with

Ledum—*continued.*

replicate margins, clothed with rusty tomentum beneath. *h.* 1ft. to 3ft. United States, &c., 1763. A handsome shrub, the leaves of which are said to be a good substitute for tea. (L. B. C. 534.)

L. l. canadense (Canadian). *fl.* white, large, disposed in terminal umbellate corymbs. April and May. *l.* ovate, petiolate, white beneath. *h.* 3in. to 6in. Canada. SYN. *L. canadense* (under which name it is figured in L. B. C. 1049).

L. l. globosum (globose) is a garden form, superior to the type. (G. C. n. s., ix. 698.)

FIG. 385. LEEA AMABILIS.

Ledum—*continued.*

L. palustre (marsh).* *fl.* white; stamens ten, longer than the corolla. April and May. *l.* linear, with revolute margins, clothed with rusty tomentum beneath. *h.* 2ft. Northern hemisphere, 1762. A smaller and narrower-leaved species than *L. latifolium.* (L. B. C. 560.)

LEEA (commemorative of James Lee, 1715-1795, a well-known nurseryman at Hammersmith, who did a good deal to popularise the Linnæan system). ORD. *Ampelideæ.* A genus of about a score species of stove shrubs or small trees, natives of tropical Asia and Africa, and the Mascarene Islands (rare in Australia). Flowers red, yellow, or green; inflorescence corymbosely cymose. Leaves alternate, usually very large, simple, or one, two, or three-pinnate. Tendrils absent. Leeas require a rich loam, and succeed best in a moist stove. Some of them are much grown in the tropics for the beauty of their fruits. Under cultivation, however, in this country, but few are worth growing. *L. amabilis* is a very handsome foliage plant.

L. amabilis (lovely).* *l.* unequally pinnate, on long channelled leafstalks; stipules large, leafy; leaflets in two or three pairs, stipellate, all more or less lanceolate, rounded at the base, acute or acuminate, sparingly serrate; upper surface of velvety texture, and deep bronzy-green colour, with a rather broad central white stripe irregularly indented at the margin; lower surface claret-red, with a translucent central green stripe. Borneo, 1880. See Fig. 385. (G. C. n. s., xvii. 493.)

L. coccinea (scarlet). *fl.* scarlet, in dense cymes. Summer. *l.* tripinnate, glabrous, dark green. Probably one of the dwarfest of the Leeas; it commences to flower when about 1ft. high. Tropical Asia. (B. M. 5299.)

LEE CHEE. *See* **Nephelium Litchi.**

LEEK (*Allium Porrum*). The Leek is a hardy biennial plant, cultivated for the use of the lower part of its leaves, which form a sort of elongated bulb (see Fig. 386). It has never been found in a wild state, and botanists who have studied the subject have confirmed the suspicions of Linnæus and the older authors that it is a cultivated form of the widely-distributed *A. Ampeloprasum.* Leeks, when well grown, and the stems thoroughly blanched, constitute an excellent and wholesome vegetable; they are also valuable as a potherb. Their extended cultivation in small gardens is confidently recommended, as in many—possibly in the majority—it is not at present attempted.

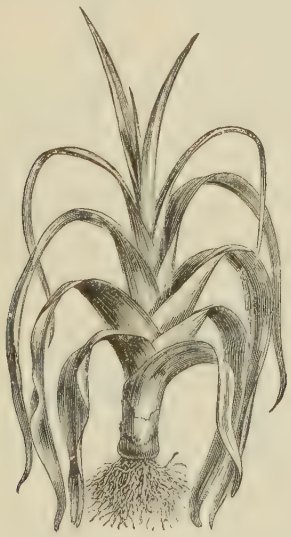


FIG. 386. LEEK.

Cultivation. Leeks are raised from seed, which should be sown thinly in a seed-bed, and lightly covered, about the middle of March. A small quantity may be sown

Leek—*continued.*

earlier than this for using first, and a later sowing will form a succession. If sown thinly broadcast, as advised, but little after-attention will be necessary, with the exception of weeding, and an occasional watering, until June, when the plants of the main crop will be ready for transferring to their permanent quarters. An open situation is preferable, and a rich soil, such as that which has been manured the previous autumn. Transplanting should be performed in showery weather, or, if such does not obtain, the ground should be lightly turned over afresh, or be watered. Planting is practised in several ways; some growers prepare trenches, somewhat like those for Celery, and add soil for blanching as growth proceeds; and others make rather large, deep holes, wherein to plant. The latter is the easiest method, and the one most largely adopted. A distance of from 1ft. to 1½ft. should be allowed (according to the variety) between the rows, and the plants placed from 9in. to 12in. asunder. Holes should be made about 3in. in diameter, and a strong plant dropped upright in each, and merely watered in. The surrounding space may be filled in with soil when hoeing, after the plants are grown sufficiently to allow of it being performed without burying the crowns. When the trench system is adopted, earthing-up must be practised occasionally, to cause the blanching, which is obtained without it by the other method. The Leeks will be fit for use from September throughout the winter and spring. Any not used before April may be lifted, and their roots laid in soil, in a cool position, until required; this will prevent them running to seed. If seed is desired, some of the best plants should be selected, and placed in a warm situation about the beginning of March. The seed ripens in autumn, and the heads containing it may be cut when matured, and suspended in a cool, dry shed, until the following spring.

Sorts. London Flag is, perhaps, the best variety for general use; it has a tall, thick stem, and is largely cultivated. The Musselburgh, or Scotch Flag, is a large and hardy sort, with long, thick stems. Ayton Castle and Henry's Prize are large and fine varieties for exhibition. The Lyon Leek is a novelty recently distributed. It is stated to have been grown and exhibited with the blanched portion 20in. in length, and 4in. in diameter; the whole plant weighing over 4lb. This variety has been well grown in Scotland.

LEGUME. The fruit of leguminous plants (*Leguminosæ*). A solitary two-valved carpel, bearing its seeds on the ventral suture only.

LEGUMINOSÆ. A very large order of trees, shrubs, and annual or perennial herbs, distributed all over the globe. The order is divided into three large sub-orders, some of the principal characters of which are mentioned below.

The first of these sub-orders, *Papilionaceæ*, has a calyx of five sepals, which are more or less united; corolla perigynous, of five irregular petals (very rarely fewer), more or less distinctly papilionaceous, *i.e.*, with the upper petal (the vexillum or standard) larger than the others, and inclosing them in the bud; the two lateral ones (the alæ, or wings) exterior to the two lower petals, which last are commonly more or less coherent by their anterior edges, forming a body named the carina, or keel, which usually incloses the stamens and pistil. Stamens ten, rarely five, monadelphous, diadelphous (mostly with nine united into one set, and the tenth, or upper one, separate), or occasionally distinct. Ovary one-celled, sometimes two-celled by an intrusion of one of the sutures, or transversely two to many-celled by cross division into joints. Flowers perfect, solitary and axillary, or in spikes, racemes, or panicles. Leaves simple, or rarely compound, alternate; leaflets almost always quite entire. All the British representatives of the order *Leguminosæ* belong to the sub-order *Papilio-*

Leguminosæ—*continued.*

naceæ, and among illustrative exotic genera are: *Cladrastis, Desmodium, Phaseolus, Robinia, Wistaria*, &c.

Cæsalpinieæ have the corolla imperfectly or not at all papilionaceous, sometimes nearly regular, the upper or odd petal inside and inclosed by the others. Stamens ten, or fewer, commonly distinct. Illustrative genera are: *Cæsalpinia, Cercis, Gleditschia, Gymnocladus*, &c.

Mimoseæ have regular flowers, with corolla valvate in æstivation and exserted; stamens often very numerous. Illustrative genera are: *Acacia, Albizzia, Mimosa*, &c.

LEIANTHUS (from *leios*, smooth, and *anthos*, a flower; alluding to the absence of hairs on the flower). Including *Petasostylis*. ORD. *Gentianeæ*. A genus comprising ten species of glabrous stove herbs or shrubs, allied to *Lisianthus*, of which five are from the West Indies; the rest are natives of Mexico and Central America. Flowers yellowish-green or blackish, rarely white, often rather large; cymes sometimes loosely trichotomous, at others in corymbose clusters or umbellate; bracts foliaceous, involucrate; corolla narrow, funnel-shaped. Leaves opposite, petiolate, sessile, or amplexicaul. The species thrive in a compost of sandy peat and loam. Propagation may be effected by seeds, sown in a pot, and placed on a hotbed; or by cuttings of young shoots, inserted in sandy soil, under a bell glass.

L. exsertus (exserted). *fl.* yellow; stamens very long, exserted, flexuose. *l.* ovate-lanceolate, pedunculate, trichotomous. West Indies, 1793. Shrub.

L. longifolius (long-leaved). *fl.* lemon-yellow, long, drooping, on short axillary and terminal pedicels; tube funnel-shaped, the five lobes being at first spreading, and afterwards reflexed. August. *l.* lanceolate or oblong-lanceolate, acute, downy. Branches fastigiate, tetragonal. *h.* 1ft. to 2ft. West Indies, 1793. An evergreen sub-frutescent annual. (B. M. 4169.) SYN. *Lisianthus longifolius* (B. R. xi. 880).

L. l. cordifolius (heart-leaved). *l.* smaller than in the type, shortly petiolate; superior ones cordate-ovate. *h.* 2ft. West Indies, 1816. Annual.

L. nigrescens (blackish). *fl.* blackish, pendulous; panicles much branched, loose. July and August. *l.* decussate, lanceolate, acuminate, three to five-nerved. Branches terete. *h.* 1½ft. Mexico, 1842. Annual. SYN. *Lisianthus nigrescens.* (B. M. 4043.)

L. umbellatus (umbellate). *fl.* green; umbels many-flowered, involucrate, axillary. May to July. *l.* obovate-lanceolate, acuminate; petioles connate. *h.* 10ft. Jamaica, 1843. Shrub. (B. M. 4213.)

LEIMANTHIUM. A synonym of **Melanthium** (which *see*).

LEIOCHILUS (from *leios*, smooth, and *cheilos*, a lip; in allusion to the smooth labellum). Erroneously spelt *Leochilus*. SYN. *Cryptosaccus*. ORD. *Orchideæ*. A small genus (four or five species) of stove epiphytal orchids, natives of the West Indies, Mexico, and Central America, closely allied to *Oncidium*, but differing in having the arms of the column placed below the stigma, and by the presence of a honey-pore at the base of the lip. Flowers usually yellow, small, racemose. Leaves oblong or narrow, flat, narrowed into the petiole. For culture, &c., *see* **Oncidium.**

L. carinatus (keeled). *fl.* panicled, on a long terete peduncle; sepals light copper-coloured; petals with a deep copper-coloured limb, and copper-coloured dots and streaks on a yellow disk; lip yellow, with white crests and chestnut spots and streaks on the disk. *l.* one to each pseudo-bulb, yellowish-green. Pseudo-bulbs ovoid, ancipitous. Mexico. (Ref. B. ii. 75.)

L. cochlearis (spoon-shaped). *fl.* pale yellow or purple-and-yellow variegated; lip obovate, blunt, crested at base; crest semi-lunar; scape filiform, erect, simple or divided. *l.* short, oblong, pointed, variable in size, usually exceeded by the scape. West Indies, 1842.

L. oncidioides (Oncidium-like). *fl.* yellow-green, tinged with red, spreading, uniform, elliptical; lip lemon-colour, blotched with pale purple. April. Pseudo-bulb ovate or oblong-ovate, smooth, green, crowned with a single, oblong-lanceolate, rather rigid, but scarcely coriaceous leaf, acute, and very obscurely striated. Mexico, 1840. (B. M. 3845, under name of *Oncidium macrantherum*).

L. sanguinolentus (bloody). *fl.* crimson. La Guayra, 1842.

LEIOPHYLLUM (from *leios*, smooth, and *phyllon*, a leaf; referring to the leaves being quite smooth). Sand

Leiophyllum—*continued.*

Myrtle. SYNS. *Ammyrsine, Dendrium, Fischera.* ORD. *Ericaceæ*. A small, erect, bushy evergreen shrub, which thrives in a peat soil, or a very sandy loam. Propagated readily by layers, made in autumn; or by seeds, sown in pans and placed in a frame, care being taken never to allow them to want water.

L. buxifolium (Box-leaved).* *fl.* white, with pink tips and backs to petals, disposed in terminal corymbs. May and June. *l.* small, convex, oval, glabrous, shining. *h.* 6in. to 1ft. New Jersey and mountains of Virginia, 1736. SYNS. *Ammyrsine buxifolia* (under which name it is figured in B. R. 531), *Ledum buxifolium* (B. M. 6752). There are two or three distinct forms of this pretty little shrub.

LEIOSPERMUM. A synonym of **Weinmannia** (which *see*).

LEIOTULUS. A synonym of **Malabaila** (which *see*).

LEITNERIEÆ. A small and but little known order of shrubs, allied to the Walnuts, inhabiting Florida and Texas. It contains but one genus, *Leitneria*, and a couple of species.

LEMBOTROPIS SESSILIFOLIUS. A synonym of *Cytisus sessilifolius.*

LEMNA (an old Greek name, of uncertain meaning). Duckmeat; Duckweed. ORD. *Lemnaceæ*. A genus comprising seven species of small, floating herbs, distributed over Europe, Northern Asia, and North America, but rare in the tropics, five being natives of Britain. These plants are without distinct stems, or real leaves, "but consist of small, leaf-like fronds, either separate, or cohering two or three together by their edges, emitting, in most species, one or more fibres from their under surface into the water, and multiplying by similar fronds growing out of their edges. Flowers very rare, appearing from a fissure in the edge, or on the upper surface of the frond" (Bentham). The species are of no horticultural value. The pretty little Chilian *Nertera depressa*, with its red fruits, sometimes passes in gardens under the absurdly wrong name of Fruiting Duckweed.

LEMNACEÆ. A natural order of very small herbaceous plants, found floating freely on the surface of stagnant waters in all climates, but especially in temperate regions. Flowers achlamydeous, naked, or enclosed in a spathe, reduced to one or two stamens, accompanied by a sessile pistil. Lemnaceæ are the smallest known Phanerogams, and are allied to *Aroideæ* and *Naiadeæ*. There are two genera — *Lemna* and *Wolffia*—and twenty species.

LEMON. The fruit of **Citrus Limonum** (which *see*).

LEMON BERGAMOTTE. *See* **Citrus Limetta.**

LEMON GRASS. Several species of *Andropogon* are called Lemon Grass, viz., *A. citratum, A. Nardus*, and *A. Schœnanthus*. The proper name of the latter species is Ginger Grass.

LEMONIA. Included under **Ravenia** (which *see*).

LENS (the classical name). Lentils. ORD. *Leguminosæ*. A small genus (probably of not more than two or three species) of hardy, dwarf, erect or sub-scandent annuals, natives of the Mediterranean region, one of them (*L. esculenta*) being extensively cultivated in Southern Europe, Northern Africa, and the warmer parts of Asia. It is not much cultivated in this country, but will succeed, if desired, in a light soil and warm situation. Seeds should be sown, at the beginning of April, in drills about 1½ft. apart, and the plants allowed to grow on the ground. When the stems turn yellow, the plants should be pulled up, and left to dry in the sun. Seeds may be stored in the husks when ready, and will keep good a long time in a dry place.

Lens—*continued.*

FIG. 387. UPPER PORTION OF PLANT AND POD OF LENS ESCULENTA.

L. esculenta (edible). *fl.* pale blue, small, in long-stalked, few-flowered, racemose clusters. Summer. *l.* usually terminating in a long, simple or slightly-branched tendril; leaflets (about six pairs) narrowly lanceolate-oblong. *h.* 6in. to 18in. Native country unknown. One of the most anciently cultivated plants; it was well-known to the Egyptians and Persians, and has been grown in Europe since the days of the Roman Empire. The seeds (lentils) are highly valued as food, being amongst the most nutritious of vegetable substances. See Fig. 387.

LENTIBULARIEÆ. A natural order of dicotyledons, belonging to Lindley's bignonial alliance of perigynous exogens. Chiefly aquatic or marsh herbs, most abundant in the tropics. Flowers showy, irregular; calyx divided, persistent; corolla bilabiate; stamens two, included; anthers one-celled. Leaves radical, either undivided or cut into filiform root-like segments, bearing little bladders. There are four genera—the best known being *Pinguicula* and *Utricularia*—and about 180 species.

LENTICULAR. Lens-shaped.

LENTILS. The seeds of **Lens esculenta** (which *see*).

LEONOTIS (from *leon*, a lion, and *ous*, *otos*, an ear; in allusion to the fanciful likeness of the corolla to the ear of a lion). Lion's Ear. ORD. *Labiatæ*. A genus comprising about twelve species of greenhouse herbs or shrubs, mostly found in tropical and Southern Africa, one species being broadly dispersed through the Mascarene Islands and East Indies; also found in tropical America. Flowers red or yellow, sessile, often showy; helmet villose; corolla tube often exserted; limb bilabiate; whorls densely many-flowered, sometimes solitary at the tops of the branches. Nutlets ovoid-triquetrous, obtuse or truncate at apex, glabrous. Leaves dentate. The species, when well grown, are very ornamental, and are of easy culture in a rich loamy soil, if once properly established. Propagated by cuttings, which strike freely, in a gentle bottom heat, in early spring.

Leonotis—*continued.*

When rooted, they should be potted off, and shifted into larger sizes as becomes requisite; continual stopping will induce a bushy growth. The plants may be kept in the open air throughout summer, and removed to the greenhouse at the approach of autumn.

L. intermedia (intermediate). *fl.* bright fulvous or orange-yellow, hairy, in whorls of about thirty from the uppermost joints of the stem. September. *l.* wrinkled, on very long stalks, smoothish and opaque above, downy beneath; lower ones ovate-cordate, obtuse; upper ones lanceolate. Stems erect, remotely jointed. *h.* 4ft. Cape of Good Hope, 1822. (B. R. 850.)

L. Leonurus.* Lion's Tail. *fl.* scarlet, villous, 2in. long; whorls rather loose; calyx finely tomentose. Winter. *l.* oblong-lanceolate, bluntly serrated, tomentose beneath, and pubescent above. Branches tomentose. *h.* 3ft. to 6ft. Cape of Good Hope, 1712. Shrubby. SYN. *Phlomis Leonurus* (under which name it is figured in B. M. 478). (G. C. n. s., xix. 186.)

L. nepetæfolia (Catmint-leaved). *fl.*, corolla deep shining orange-scarlet, upper lip projecting far beyond the nether one; whorls distant, many-flowered. September. *l.* cordate, obtusely and deeply serrated, green, sub-tomentose; petiole the length of the leaves. *h.* 4ft. to 6ft. East Indies, 1778. (B. R. 281.)

LEONTICE (from *leon*, *leontos*, a lion; alluding to the fancied resemblance in the leaves to the print of a lion's foot). ORD. *Berberideæ*. A small genus (three or four species) of herbs, with tuberous rhizomes, natives of central Asia and South Europe. Flowers yellow, racemose; racemes sub-paniculate; sepals six to nine, petaloid; petals six, much shorter than the sepals, truncate at apex. Leaves twice or thrice pinnate or trisected, with rather thick segments; cauline ones few. *L. altaica*—the species best known to cultivation—is a half-hardy plant, succeeding in common soil. It may be increased by offsets, or by seeds.

FIG. 388. LEONTICE ALTAICA, showing Habit, detached Leaf, and Portion of Inflorescence.

L. altaica (Altaic). *fl.* about twelve, in terminal deflected racemes; pedicels one-flowered; petals erect, semi-cylindrical. April. *l.* solitary, petiolate; petiole tripartite, with spreading divisions, each bearing on its summit five elliptical, glaucous, unequal leaflets, on partial petioles. Stem erect, succulent, green at base. *h.* 3in. to 6in. Altai Mountains. See Fig. 388. (B. M. 3245.)

L. Chrysogonum. *See* **Bongardia Rauwolfii.**

LEONTODON (from *leon*, *leontos*, a lion, and *odons*, tooth; referring to the tooth-like margins of the leaves). Hawkbit. Including *Thrincia*. ORD. *Compositæ*. This genus comprises about forty species of hardy herbaceous plants, of which one is a native of North America, and the rest inhabit Europe, Central and Western Asia, and North Africa. Florets entirely strap-shaped, and surrounded by several rows of overlapping bracts; receptacle naked. Leaves spreading, toothed. None of the species are of any value horticulturally.

LEONTOPODIUM (the Greek name, given originally by Dioscorides; from *leon*, *leontos*, a lion, and *pous*,

Leontopodium—*continued.*

a foot; in reference to the flower-heads resembling the foot of a lion). Lion's Foot. ORD. *Compositæ*. A genus comprising five species of tufted woolly perennial herbs, of which three (probably varieties of one) inhabit the mountains of Europe, and extra-tropical Asia, and the

FIG. 389. LEONTOPODIUM ALPINUM.

others are natives of the Andes of South America. Flower-heads small, in dense cymes at the apices of the branches; floral leaves involucrate, clustered. Leaves, radical ones sub-spathulate; cauline ones alternate, entire. *L. alpinum*, the only species in cultivation, is a pretty

FIG. 390. FLOWER-HEAD OF LEONTOPODIUM ALPINUM.

hardy plant, which is largely collected for sale by the peasants in Switzerland, &c., under the popular title of Edelweiss. It succeeds in firm, well-drained sandy soil, on exposed parts of rockwork. New plants may be raised from seeds, annually, or the old plants may be divided,

Leontopodium—*continued.*

in spring. Seeds ripen but sparingly in this country in moist seasons, but are more freely produced when the summers are favourable. They must be kept in a dry place throughout the winter.

L. alpinum (alpine).* Edelweiss. *fl.-heads* terminal, enveloped in woolly bracts. June and July. *l.* white, woolly; lower ones lanceolate, narrowed into the stalk; cauline ones sessile, linear-oblong. *h.* 6in. Alps, 1776. See Figs. 389 and 390. (B. M. 1958, under name of *Gnaphalium Leontopodium*.)

LEOPARD MOTH. This insect is widely diffused in England, but is seldom very abundant. The moths, both male and female, have the ground colour white, semi-translucent on the wings, scattered thickly with blue-black roundish spots. The hind wings have the spots less distinct. The antennæ, in both sexes, are rather

FIG. 391. LEOPARD MOTH (ZEUZERA ÆSCULI)—FEMALE.

short; in the female (see Fig. 391), they are thread-like, but in the male they are pectinate at the base on each side. The larva (see Fig. 392) is whitish, with black glossy spots, and has a blackish plate on the segment next the head. It feeds on the wood in the interior of the stems and branches of Pear, Apple, and Plum-trees; but the trees seem to suffer very little from its attacks, and Newman even remarks that the infested trees seem to bear larger crops of fruit than the healthy ones. The pupæ may be found in the galleries bored by the larvæ; they move readily along by means of rings of small spines on the hinder parts of the body. The moths appear

FIG. 392. CATERPILLAR OF LEOPARD MOTH.

about midsummer, and may be found on the tree trunks. The males are attracted by light, *e.g.*, to gas lamps. If desired, the larvæ may be killed in their burrows either by pushing down a strong wire, or by injecting a solution of soft-soap or tobacco-water. It has also been recommended to force fumes of sulphur or tobacco-smoke into the burrows. *See also* **Insects.**

LEOPARD'S BANE. *See* **Doronicum.**

LEOPOLDINIA PULCHRA. *See* **Cocos Weddeliana.**

LEPANTHES (from *lepis*, a scale, and *anthos*, a flower; scales flower-shaped, including the stem). ORD. *Orchideæ*. A genus comprising about forty species of stove epiphytal orchids, natives of the Andes of South and Central America, the West Indies, and Mexico. Allied to *Pleurothallus*. Flowers very small; peduncles often clustered; sepals spreading; petals small; lip often adnate to the base of the column, two-lobed. The two species described below are those best known to cultivation. For culture, *see* **Pleurothallus.**

Lepanthes—*continued.*

L. calodictyon (handsome-netted). *fl.* yellow and red, very small. *l.* sessile, pale green, with rich brown veins. *h.* 2in. New Grenada, previous to 1861. (B. M. 5259.)

L. sanguinea (blood-coloured). *fl.* blood-coloured; peduncles aggregate, shorter than the leaf; sepals ovate, glandularly ciliated, as also the lip; lateral lobes of lip wing-formed, spreading, middle lobe three-lobed, pressed to the column. January. *l.* ovate, three-toothed. Jamaica, 1843. (B. M. 4112.)

LEPANTHUS. A synonym of *Heteranthera.*

LEPECHINIA (named after John Lepechin, a Russian botanist, who died in 1802). ORD. *Labiatæ.* A genus comprising three species of half-hardy Mexican herbs. Corolla yellowish or whitish; tube shorter than the calyx, naked within; limb shortly bilabiate; whorls six to ten-flowered, in dense terminal crowded spikes, or the lower ones, or sometimes all, scattered. Nutlets ovoid, smooth. Leaves rugosely dentate. The undermentioned species requires a loamy soil. Propagated by divisions of the plant in spring; or by cuttings of young shoots, placed under a hand glass, at the same season.

L. spicata (spiked). *fl.* yellow, small; whorls crowded into terminal oblong or sub-globose spikes, 1in. to 1½in. long. Summer. *l.* nearly sessile, 2in. to 6in. long, ovate, obtuse, crenulated, wrinkled. Stem erect. *h.* 1ft. to 1½ft. Mexico, 1800. (B. R. 1292.)

LEPERIZA. The plants formerly placed in this genus are now included, by Bentham and Hooker, under **Phædranassa** and **Urceolina** (which *see*).

LEPICYSTIS. Included under *Polypodium.*

LEPIDAGATHIS (from *lepis, lepidos,* a scale, and *agathis,* a ball; referring to the curved inflorescence, and the flowers being placed between the scaly bracts). ORD. *Acanthaceæ.* A genus comprising about fifty species of herbs or sub-shrubs, natives, for the most part, of the East Indies, the Malayan Archipelago, and tropical Africa, with two inhabiting tropical America. *L. cristata,* probably the only species yet introduced, is a stove evergreen shrub, thriving in any light, rich soil. Cuttings of young shoots will root during May, if inserted in sandy soil, and placed in bottom heat.

L. cristata (crested). *fl.* purple. June. *l.* linear-lanceolate or oblong, glabrous. *h.* 2ft. India, 1820.

LEPIDIUM (*Lepidium,* Greek name used by Dioscorides: it is a diminutive of *lepis,* a scale, and probably alludes to the form of the pods). Pepperwort. ORD. *Cruciferæ.* A genus comprising from sixty to eighty (by some authors estimated at 100) species of herbs or sub-shrubs, widely dispersed, and of variable habit. Flowers white, small, racemose, ebracteate. Leaves variable. The species are valueless as ornamental subjects; but the undermentioned is an esteemed salad plant.

L. sativum (cultivated). Common Garden Cress. *fl.* white. June. Pods orbicular, winged. *l.* variously cut and divided. Branches not spiny. *h.* 1ft. to 1½ft. Probably a native of Persia, &c., 1548. An erect branched, smooth hardy annual. (Sy. En. B. 155.) *See also* **Cress, Garden.**

LEPIDOCARYA. A synonym of **Parinarium** (which *see*).

LEPIDOPTERA. This order of insects includes the butterflies and moths alone. It is well characterised by the four large membranous wings, covered with small scales, and by the entirely suctorial mouth; in the latter, the jaws are adapted to form a long tube, which, when not in use, is spirally coiled away below the head. The larvæ are known as caterpillars, and possess six true legs on the front segments, besides a variable number of prolegs or fleshy legs behind. They feed almost always on plants, and are often very destructive (*see* **Hawthorn Caterpillars, Hybernia,** &c.). The pupæ are almost motionless, and are often inclosed in a cocoon of silk, earth, or other material. The limbs in the pupæ are closely bound down to the body (obtected). The Lepidoptera are divided into two great groups: *Diurni,*

Lepidoptera—*continued.*

or butterflies, with antennæ usually clubbed at the tip; wings usually erect in repose, not connected by a spine and hook; pupæ usually naked and often angular; almost all are day fliers. *Nocturni,* or moths, with antennæ pointed at tip; wings connected by a spine and hook, usually horizontal in repose; pupæ more rounded than pupæ of the Diurni, almost always in a cocoon; mostly nocturnal in their habits. The larvæ of this group are more frequently injurious than those of the Diurni.

LEPISMIUM. This genus is now included, by the authors of the "Genera Plantarum," under **Rhipsalis** (which *see*).

LEPTANDRA. Included under **Veronica** (which *see*).

LEPTINELLA (from *leptos,* slender, small; on account of the habit and size of the plants). ORD. *Compositæ.* A genus (now included, by Bentham and Hooker, under *Cotula*) consisting of about eighteen species of hardy, mostly perennial, herbs, inhabiting Australia, New Zealand, and the Antarctic regions. Flower-heads rather small; receptacle at length conical; corollas yellow; achenes glabrous. Leaves alternate, pinnatifid or pinnately dissected, rarely undivided or toothed. *L. dioica* makes a pretty summer carpet of dark green slightly pinnatifid leaves, and is much used for carpet bedding. For culture of the three species described below, *see* **Paronychia.**

L. dioica (diœcious).* *fl.-heads* pale yellowish (male and female similar), small, on slender scapes, which may equal leaves in length. Summer. *l.* stalked, dark green, 1in. to 2in. long, linear or spathulate, obtuse, semipinnatifid. Stems creeping, rather stout, short. *h.* 2in. to 3in. New Zealand.

L. lanata (woolly). *fl.-heads* ¼in. in diameter; involucre fleshy, three or four-seriate, glabrous, glandular, elliptic-rotundate; peduncles shorter than the leaves. *l.* petiolate, oblong, obtuse, pinnatifid; segments acute, the margins of the upper ones pinnatifid-serrate; base sheathed. Stem prostrate. Lord Auckland's Islands.

L. plumosa (feathery). *fl.-heads* solitary, about ¼in. in diameter; receptacle naked, conical; involucre one-seriate; peduncles terminal and lateral, solitary, elongated, slender, as long as the petioles. *l.* long-stalked, linear-oblong, obtuse, tripinnatifid; segments ultimately subulate. Lord Auckland's Islands. Plant softly and loosely hairy.

LEPTOCERAS. Included under *Caladenia.*

LEPTOCHILUS. Included under *Acrostichum.*

LEPTOCIONIUM. Included under *Hymenophyllum.*

LEPTODACTYLON. Included under **Gilia** (which *see*).

LEPTODERMIS (from *leptos,* slender, and *derma,* the skin; in reference to the thin bark). ORD. *Rubiaceæ.* A genus comprising three or four species of evergreen branching shrubs, natives of the Himalayan Mountains and Eastern Bengal, with one inhabiting North China. Flowers white or pink, at the apices of the branches or branchlets, shortly axillary, sessile. Leaves opposite, shortly petiolate, lanceolate. Branches twiggy, terete. *L. lanceolata,* the only species yet introduced, is a greenhouse shrub, allied to **Hamiltonia** (which *see* for culture).

L. lanceolata (lanceolate). *fl.* white, scentless, sessile by threes at the ends of the branches; involucre calyciform, of two leaves; corolla funnel-shaped, scabrous. June. *l.* lanceolate, attenuated, acute, membranous, villous; stipules triangular, villous. Branches quadrangular, downy while young. *h.* 6ft. Nepaul, 1842.

LEPTOGRAMME. Included under *Gymnogramme.*

LEPTOMERIA (from *leptos,* slender, and *meris,* a part; referring to the slender and almost leafless shoots). ORD. *Santalaceæ.* A genus comprising fourteen species of greenhouse shrubs, limited to Australia. Flowers minute, in little terminal or lateral spikes, racemes, or clusters. Branches numerous, slender, or rigid, apparently leafless. Leptomerias thrive in a compost of sandy peat and fibry loam, to which may be added a few pieces of charcoal. Propagated by cuttings of firm young shoots, placed in sand, under a bell glass. In all proba-

Leptomeria—*continued.*

bility, the species described below is the only one yet introduced.

L. Billardieri (Labillardière's). *fl.* white, very minute, disposed in numerous spikes. *fr.* greenish-red, fleshy, edible. Branches erect, very slender. *h.* 6ft. 1823.

LEPTOPLEURIA. Included under *Dicksonia.*

LEPTOPTERIS (of Blume.) A synonym of **Gelsemium** (which *see*).

LEPTOPTERIS (of Presl). *See* **Todea.**

LEPTOPYRUM. Included under **Isopyrum** (which *see*).

LEPTOS. In Greek compounds this signifies slender, graceful; hence, *leptophyllus*, slender-leaved.

LEPTOSIPHON. Included under **Gilia** (which *see*).

LEPTOSPERMUM (from *leptos*, slender, and *sperma*, a seed; seeds slender). Including *Fabricia.* ORD. *Myrtaceæ.* This genus comprises about twenty-five species of greenhouse or half-hardy shrubs, rarely small trees, mostly natives of Australia. Flowers usually white, sessile, or rarely shortly pedicellate, solitary, or two or three together, at the ends of short branchlets, or in the axils of the leaves. Leaves alternate, small, rigid, entire, nerveless, or one or three-nerved. Leptospermums thrive in a compost of loam and peat, to which may be added a small quantity of sand and charcoal. Propagated by cuttings of young shoots, placed in sand, under a glass, during May; or by seeds, sown in gentle heat, during March. The species are not very generally cultivated.

L. ambiguum (ambiguous). A synonym of *Kunzea corifolia.*

L. attenuatum (thin). *fl.* white, usually two on a short silky peduncle; calyx tube densely silky-pubescent. Summer. *l.* linear-lanceolate, acute. *h.* 3ft. to 6ft. Australia, 1795.

L. flavescens (yellowish). *fl.* white; calyces glabrous. Summer. *l.* linear-lanceolate, obtuse, dotted. *h.* 4ft. to 6ft. Australia, 1788.

L. f. grandiflorum (large-flowered). *fl.* white, large; calyces villous, with coloured teeth. Summer. *l.* lanceolate, narrowed at both ends, mucronate. *h.* 4ft. to 6ft. Australia, 1803. (L. B. C. 514.)

L. f. obovatum (obovate). *fl.* white; calyces glabrous, with coloured teeth. Summer. *l.* obovate, emarginate, glabrous. Branches angular, a little winged. *h.* 3ft. to 6ft. Australia.

FIG. 393. FLOWERING BRANCHLET OF LEPTOSPERMUM LÆVIGATUM.

L. lævigatum (smooth). *fl.* axillary, solitary and sessile, or nearly so, or very rarely two together, on a common peduncle. *l.* from obovate-oblong to oblong-cuneate, or narrow-oblong, obtuse, mostly ¼in. to ⅔in. long. *h.* 20ft. to 30ft. Australia. SYN. *Fabricia lævigata.* See Fig. 393. (B. M. 1304.)

L. lanigerum (wool-bearing). *fl.* white; calyces very villous, from spreading pili. Summer. *l.* oblong or oval, mucronate, pubescent on both surfaces, or only beneath. *h.* 3ft. Van Diemen's Land and Australia, 1774.

L. myrtifolium (Myrtus-leaved). *fl.* rather small, all, or nearly all, solitary, sessile and axillary. *l.* usually small, obovate or oblong, flat or concave, nerveless, or one or three-nerved. *h.* 8ft. to 10ft. Australia.

Leptospermum—*continued.*

L. scoparium (Broom-like). *fl.* reddish-lilac; calyces glabrous Summer. *l.* ovate, mucronate. *h.* 4ft. to 6ft. New Zealand, 1772 and 1876. The leaves of this species are used as tea. There is a variety of this, *grandiflorum*, figured in B. M. 3419.

L. s. juniperinum (Juniper-like). A narrow-leaved form, agreeing with the type, except in the foliage.

LEPTOSYNE (from *leptosein*, slenderness; a name applicable to the original, but not to most of the species, except as to the leaves and their divisions). ORD. *Compositæ.* A genus (now included, by Bentham and Hooker, under *Coreopsis*, but regarded as distinct by Dr. Asa Gray) containing about seven species of New World annual or perennial, herbaceous or suffruticose, smooth and glabrous plants, with showy pedunculate heads—the ray and disk being both bright yellow—and pinnately divided or dissected leaves. They have the habit of *Coreopsis* (which they represent on the Western side of North America), "but mostly with pistillate rays, and always with a ring on the tube of the disk corollas, or at its juncture with the throat" (Gray). For culture, *see* **Coreopsis.**

L. calliopsidea (Calliopsis-like). *fl.-heads* rather large and broad, with peduncles a span long. Autumn. *l.*, lobes narrowly linear, sometimes incised. *h.* 1ft. to 2ft. California. Annual. (R. H. 1873, 330, under name of *Leptosyne maritima.*)

L. maritima (maritime). *fl.-heads* large; rays sixteen to twenty, lin. or more long; disk generally lin. in diameter. Autumn. *l.* bipinnately divided into narrowly linear lobes of a line or two in width. *h.* 1ft. Perennial. (B. M. 6241, under name of *Coreopsis maritima.*)

L. maritima, of "Revue Horticole" (maritime). A synonym of *L. calliopsidea.*

LEPTOTES. Included under **Tetramicra** (which *see*).

LESCHENAULTIA (named after L. T. Leschenault, 1773-1826, a French botanist and traveller). Formerly spelt *Lechenaultia.* ORD. *Goodenovieæ.* A genus comprising sixteen species of very ornamental greenhouse herbs, under-shrubs, or shrubs, confined to Australia. Flowers blue, white, yellow, red, or greenish, either solitary and terminal or leaf-opposed, or several in compact, leafy, terminal corymbs; corolla oblique, the tube slit open to the base, or rarely closed, the lobes all or partially erect, and connivent or spreading. Leschenaultias are amongst the most beautiful and effective of greenhouse hard-wooded plants. Their successful cultivation requires the most careful attention at all seasons, particularly in regard to watering. They are propagated from cuttings, which should be taken, in spring or summer, from the points of shoots that are moderately firm, and inserted in well-drained pots of very sandy peat, under a shaded bell glass, in a little heat. Established plants will sometimes require a little stopping, to insure a symmetrical habit. This should be seen to so soon as flowering is over; and, if it is necessary, a few small stakes may be used for training or supporting the branches left. The soil used in potting or re-potting should consist of fibry peat and silver sand. It is very important that the stem of the plant should not be buried, or placed so as to be lower than the surrounding soil. A rather close frame will be best for a time, after the roots have been disturbed; but a light, airy situation should be afforded at all other times. The plants should not be exposed in the open air to ripen their growth; this treatment is generally injurious, if not fatal to them, although it is beneficial to many other plants of a hard-wooded, but much stronger-growing nature. If a light, sunny position, under glass, is selected for their cultivation throughout the autumn and winter, ripening of the wood may fairly be expected, and the plants will be uninjured by alternate heavy rains and drying winds. Only soft water should be used for watering, and it should be judiciously administered at all times. *L. biloba major* is perhaps the finest blue-flowered hard-wooded shrub in cultivation, and *L. formosa* is an exceedingly handsome species. The species described below are those best known to cultivation.

Leschenaultia—*continued.*

L. arcuata (arched). A synonym of *L. linarioides.*

L. Baxteri (Baxter's). A synonym of *L. formosa.*

L. biloba (two-lobed).* *fl.* blue; corymbs few-flowered; segments of corolla cuneated, deeply two-lobed, with a mucrone between them. June to August. *l.* linear-obtuse. Stem branched. *h.* 1ft. 1840. Shrub. SYNS. *L. Drummondi, L. grandiflora.* (B. R. 1841, 2.) The form *major* is a very desirable one, being somewhat larger, in all its parts, than the type.

L. chlorantha (greenish-flowered). *fl.* similar to those of *L. formosa*, but pale green in colour; the two upper connivent lobes of the corolla are acuminate, and more or less recurved. *l.* ¼in. to ½in. long. A low, diffuse, much-branched shrub, with the habit of *L. formosa*, of which it is probably only a variety.

L. Drummondi (Drummond's). A synonym of *L. biloba.*

L. formosa (handsome).* *fl.* scarlet, axillary, solitary, bractless, drooping; upper lip of corolla rounded, entire; lower ones tripartite. June to September. *l.* linear. *h.* 1ft. 1824. Shrub. SYNS. *L. Baxteri, L. multiflora* (L. B. C. 1579), *L. oblata.* (B. M. 2600; B. R. 916.)

L. grandiflora (large-flowered). A synonym of *L. biloba.*

L. laricina (Larch-like). *fl.* scarlet; corymbs three to five-flowered; corolla having the tube hairy inside at the bottom; segments spreading, two-lobed. June to August. *l.* filiform, compressed, apiculate. Stem branched. *h.* 1ft. 1844. Shrub. SYN. *L. splendens* (under which name it is figured in B. M. 4256).

L. linarioides (Toadflax-like). *fl.* yellow, terminal; corolla large, with three broad spreading bifid segments and two smaller entire ones. August. *l.* scattered, filiform. Stem branched. 1844. Shrub. SYNS. *L. arcuata* (B. M. 4265), *Scævola grandiflora.*

L. multiflora (many-flowered). A synonym of *L. formosa.*

L. oblata (oblate). A synonym of *L. formosa.*

L. splendens (splendid). A synonym of *L. laricina.*

LESPEDEZA (named after D. Lespedez, once Governor of Florida, and a great patron of botany). ORD. *Leguminosæ.* This genus comprises about twenty-five species of annual or perennial herbs, shrubs, or sub-shrubs, distributed over North America, temperate Asia, the mountains of the East Indies, and the Archipelago, and also in Australia. Flowers purplish, rose or white, borne in axillary clusters or racemes, or terminal panicles; calyx lobes nearly equal, or the upper two shortly united; standard orbicular, obovate or oblong, narrowed into a claw; wings free; keel obtuse or beaked. Leaves pinnately trifoliolate, rarely one-foliolate; leaflets entire, exstipellate; stipules free. Several species have been introduced; but, except *L. bicolor*, they are but rarely seen in cultivation.

L. bicolor (two-coloured). *fl.* rosy-purple, numerously produced in long pendulous branched panicles. *l.* glabrous, with oblong leaflets. *h.* 4ft. to 6ft. North China and Japan. SYN. *Desmodium penduliflorum.* (B. M. 6602.)

L. reticulata (netted). *fl.* violet; peduncles few-flowered. *l.*, leaflets varying from oval-oblong to linear, whitish-downy beneath, with close-pressed pubescence. North America. There are several varieties, the principal of which are:

L. r. angustifolia (narrow-leaved). *fl.* closely clustered on straight branches. *l.* crowded; leaflets narrowly oblong or linear, often silky.

L. r. divergens (diverging). *fl.* loosely panicled. *l.*, leaflets oval or oblong.

L. r. sessiliflora (sessile-flowered). *fl.* principally on peduncles much shorter than the leaves.

LESSER MAY BUG. *See* **May Bugs.**

LESSERTIA (named after Benjamin de Lessert, of Paris, 1773-1847, author of "Icones Plantarum"). ORD. *Leguminosæ.* This genus comprises about thirty species of greenhouse herbs or sub-shrubs, natives of the Cape of Good Hope. Flowers pink or red, rarely white, in axillary pedunculate racemes; vexillum sub-orbiculate, spreading or reflexed, naked within; claw short; wings oblong; keel upright or incurved, obtuse, often shorter than the vexillum. Leaves impari-pinnate; leaflets entire, exstipellate. Probably the species here described is the only one now in cultivation. It thrives in a loam and peat compost. Propagated by seeds, or by divisions, in spring.

L. perennans (enduring). *fl.* with a pale base and red or purple apex, numerous, drooping; racemes longer than the leaves, loose, elongated, pedunculate. August. *l.*, leaflets oval, silky beneath, pubescent above. *h.* 1ft. 1776. Herbaceous perennial. (B. M. 6106.)

LETTSOMIA. Now included under *Freziera.*

LETTUCE (*Lactuca sativa*). The Lettuce is a hardy annual, which has been extensively cultivated in this country since, and most likely long previous to, 1562. Botanists agree in looking upon the garden Lettuce as a cultivated race which has originated from *L. scariola.* The old Greeks and Romans cultivated the Lettuce as a salad plant (Theophrastus mentions three varieties), and in the Orient it was, perhaps, grown at a still more remote period. There are two distinct types, termed respectively Cabbage and Cos varieties. The latter may have been introduced from the Greek Archipelago or the Levant, as it derives its name from an island there, originally known as Cos. Cabbage Lettuces are distinguished by their broad, rounded leaves, forming a low, spread-

FIG. 394. CABBAGE LETTUCE.

ing head nearly close on the ground (see Fig. 394). Cos varieties grow upright, and the leaves are more of an

FIG. 395. COS LETTUCE.

oblong shape (see Fig. 395). Lettuces, especially good Cos varieties, are very popular, and amongst the most useful of salading plants. To insure crisp, thoroughly-blanched hearts, it is necessary, with some sorts, to close the outer leaves together, and tie them. There are others which overlap, and do not require this attention to secure the desired end. Acres of land are devoted to the first spring crop in the neighbourhood of large towns, the demand for a supply of Lettuces being very great at this season. There are few gardens in which some are not grown according to requirements, and, practically, none in which a few would not be acceptable.

Cultivation. Lettuces are in request nearly all the year

Lettuce—*continued.*

round, in places where they are procurable. The spring and early summer supply is, perhaps, generally the most important. The most successful method adopted with plants for this crop is to sow in frames about the middle of September, and again in October. The frames should be prepared some time in advance, by having a bed of fermenting material, from 1ft. to 2ft. thick, placed beneath them, and the inside filled up to within 1ft. of the glass. About 6in. of light soil should be laid over the surface, after the manure has been evenly trodden down. Fermenting material admits of free passage for water, and, consequently, keeps the plants well drained; its heating properties are not required. Seeds may be sown broadcast, and the sashes kept on until germination takes place, when air should be freely admitted in fine weather. When the plants are large enough to handle, the weakest should be thinned, so as to leave the others about 2in. apart. But little water will be required during the winter, the object being to induce a hardy and sturdy growth, and prevent damping. This latter is chiefly to be guarded against in winter time, as it frequently causes much injury. Frost should merely be excluded by coverings of dry litter, or similar material, and this should be removed by day on all favourable occasions. Growth may be encouraged as the days lengthen, and the plants be gradually inured, and placed outside in February, where they are intended to grow. The state of the weather, and the severity of the season, must be taken into consideration, as these may vary each year, and cause special arrangements to be made.

Lettuces like a rich, rather light, soil, which should be manured deeply down, where the roots are situated. A distance of about 1ft. apart each way allows sufficient space for the plants to develop. If dibbers are used, the holes should be well filled in, either at the time of planting, or afterwards with a hoe. Growers of early Lettuces on a large scale are particular in filling dibber-holes from the south or sunny side, as, although apparently a trifling matter, the plants are found to succeed much better than when the reverse plan is adopted. Frequent hoeings in fine weather greatly encourage growth, and also prove beneficial in keeping down weeds and destroying slugs, which always prove very destructive to young Lettuces.

In mild and favourable localities, the foregoing method of winter cultivation and protection is not generally followed; hardy varieties being selected and grown on south borders outside. When intended for outside culture, they should be sown a month or more earlier than when frames are to be used for winter protection, in order that the plants may be large, and better able to withstand frost and wet. A sheltered border, sloping to the south, should be selected, and none but hardy varieties grown, such as the Hammersmith Hardy Green Cabbage, and Brown or Bath Cos. In many gardens, these varieties are sown about the middle of August, and the plants transferred, during the autumn, to any warm or sheltered positions; the foot of a south wall being usually one amongst others selected. Cabbage varieties may be placed from 6in. to 9in. apart, and a reserve stock should be kept in the seed-bed for filling up any blanks that occur. If some of the plants from this sowing are placed 6in. apart, on an old hotbed, under glass, and kept protected during winter, they will prove useful in spring, before those grown outside are ready.

Seed sowing of Lettuces in spring should be commenced in a warm frame about the end of January, or early in February, and be repeated at the end of the latter month for a succession. Small plants thus raised must be pricked out under hand glasses, or on a spent hotbed, until they are sufficiently strong for placing in the open ground. From the middle of March until August it is

Lettuce—*continued.*

advisable to make successional sowings, according to requirements, in open borders, at intervals of two or three weeks; then, if one lot should run to seed quickly, because of hot weather, another will soon be coming on. Timely thinning in the seed-bed is very important, as the plants, if once allowed to draw, never do so well afterwards. Few positions are unsuited for Lettuces in summer, provided they are attended to, by careful planting and watering at first, and there is sufficient light to prevent the leaves drawing up instead of forming close hearts. In small plantations, it is preferable to transplant with a trowel in summer time, to prevent a severe check being caused by injury to the roots. Advantage should always be taken of cloudy weather, if possible, for the operation. Any of the autumn crops may be lifted before the appearance of frost, and re-planted, rather closely, in any spare frame or house, free from drip, and where frost is merely excluded. By adopting this method of preservation, the season of supply may be considerably prolonged.

Seed-saving. Where it is desirable to save seed, the finest specimens should be selected for the purpose, such as form good hearts, and do not previously show a disposition to seed early. Different varieties must be kept isolated, or separated in some way, when in flower, to keep the product true to the original character. The parts which flower, and, consequently, ripen the seeds first, produce the best; and they should be secured in preference to waiting for the ripening of the whole lot. If the branchlets are collected, and laid on a cloth in the sun, when the seeds are in a forward state, the latter soon ripen, and may be rubbed out. Seeds may keep good for three or four years, but they are always considered best the second year, and should be tested before being depended on afterwards.

Sorts. The names of these are extremely numerous; but large numbers of supposed sorts, when grown under similar conditions, have been found synonymous, or insufficiently distinct to merit their separate names. The following is a list of good varieties in each class; those marked with an asterisk are specially recommended.

Cabbage Lettuces. *ALL THE YEAR ROUND, very hardy, compact, and of good quality. BROWN DUTCH, much like the White Dutch, except that the leaves are more brown where exposed; it forms a good-sized head, which blanches white, and is of excellent quality. *EARLY PARIS MARKET, a valuable early sort, much grown in France. *HAMMERSMITH HARDY GREEN, leaves thick, dark green, wrinkled; one of the hardiest and most extensively grown sorts of this class. LARGE WHITE, heads large, somewhat flattened, withstands hot weather well; a good sort for summer use. MALTA, heads flat, compact, blanches well; leaves pale green, somewhat soft. *NEAPOLITAN, heads large, firm, and crisp, habit dwarf; a good variety, of excellent quality, considered the best for summer. STANSTEAD PARK, compact, good for autumn sowing, with light protection in winter; very similar to White Dutch *TENNIS BALL, small sort, forming close hearts, which are white and crisp. TOM THUMB, very compact and of excellent quality; good for all seasons. *WHITE DUTCH, a hardy sort, which hearts readily; larger than Hammersmith Hardy Green.

Cos Lettuces. ALEXANDRA WHITE, of immense size, crisp, fine flavoured. *BROCKET HALL BROWN, hardy, and of excellent flavour; stands a long time before running to seed. *BROWN OR BATH BLACK-SEEDED, large, hearts well when tied up; a very hardy variety, the best of all for standing the winter. EARLY GREEN, tolerably hardy variety, smaller but a little earlier than Paris Green. *MOOR PARK, large and crisp, hardy, and not liable to run to seed. NUNEHAM PARK, solid and crisp, grows to a large size. *PARIS GREEN, resembles Paris White, except that it is hardier; the leaves are dark green before being blanched; an excellent variety, requiring no tying. *PARIS WHITE, large, heart very white, crisp, and excellent; blanches well without tying; generally esteemed as the best summer Cos variety in cultivation. SUGARLOAF, good hardy variety for autumn sowing; requires no tying.

Injurious Insects. In common with most salad herbs and potherbs, Lettuce suffers from the ravages of many kinds of larvæ; and it is also the chosen food of a few insects. The roots are eaten by the larvæ of Click Beetles (Wireworms) and of Cockchafers (May Bugs).

Lettuce—*continued.*

The leaves are devoured by the caterpillars of not a few of the larger Moths, including the Tiger Moth (*Arctia Caja*) and its allies, and the genera *Agrotis*, *Noctua*, *Mamestra*, *Plusia*, and other thick-bodied night moths. For the methods of destroying such larvæ, *see* **Insects, Surface Caterpillars,** and **Tiger Moth.** The Lettuce Fly (*Anthomyia Lactucæ*), in the maggot stage, feeds on the fruits, eating out the seeds, and thereby destroying the harvest when plants are grown for seed. The maggots are footless, tapering near the head, truncate and toothed at the tail, dirty yellowish-white, and a little over ¼in. long when full grown. In the Lettuce head, or on the ground, they turn to pupæ, oval in form, and red-brown in colour. The flies emerge from the pupæ in early summer. They are about the size of a house-fly, and are rich brownish-black, with brown wings. Infected seed should not be used for sowing; and, as soon as the plants are seen to be diseased, the whole crop should be carefully looked over, and the larvæ removed, or, if not worth this trouble, the plants should be burned, to destroy the maggots. Aphides, or Green Flies, of several species, feed on Lettuces, two or three kinds of *Siphonophora* feeding on the leaves and young shoots, and species of the genus *Pemphigus* dwelling on the roots. The latter are far more hurtful than the former, as they kill the roots, and thus destroy the plants. *Pemphigus* belongs to a group of Aphides that want the two tubes so conspicuous in the others on the hinder segments of the back of the abdomen, and that have the cubital vein third from the body in the front wing not forked. The species hurtful to Lettuce are *P. fuscifrons* and *P. lactucarius*. Both live in cavities hollowed out of the soil beside the roots, and lined with fine cottony filaments secreted from the bodies of the insects. The second species is usually the more common and destructive of the two, and forms the secretion more plentifully than the other. Prevention is difficult; nor is an attack usually suspected till the drooping of the plants indicates injury to the roots. The Aphides are generally found on scraping away some earth from the surface of the roots. Soaking the ground around the plants with soapsuds, lime-water, or tobacco-water, has been suggested as a remedy; but the gain would scarcely repay the cost. Infested plants should be speedily and carefully removed, so as to destroy the Aphides on the roots; and the ground should have quicklime or gas-lime dug into it to destroy any of the pests that may remain in the soil. Attacks may, perhaps, be prevented by surface-dressings of soot, lime, or other substances disagreeable to insects. Both species live also upon the roots of various grasses and other plants; hence it is difficult to eradicate them.

Fungi. Of these, the most hurtful is the Lettuce Mildew (*Peronospora ganglioniformis*). Affected leaves show a yellowish discoloration on the upper surface, and on the lower surface there is a coat of fine white velvety threads, too small to be seen with the unaided eye. Under the microscope, the hairs are seen to be bifurcated from five to seven times, and each ultimate branch ends in a flattened dilatation, which bears four minute stalks on the corners, and one in the middle, each surmounted by an oval or nearly globular minute one-celled spore. In cold weather, in autumn, resting-spores are also produced in the tissues of the host plant. Their special use is to withstand the cold season, and to propagate the fungus when the weather becomes fit again to stimulate growth in spring. The velvety threads above described are pushed through the stomata, or little mouths of the plant. After a time, the patches of the leaf that bear the fungus begin to decay, and soon pass into a pulpy, rotten condition. The outer leaves are the first part affected, in spring, while the flowers and seeds also frequently suffer much in the autumn. The more crowded the Lettuce plants are, the more liable are they to injury from this fungus. If the plants are grown in a close, damp atmosphere, such as that in a frame for forcing them, in spring, or if weakened in any way, the Mildew does far greater mischief than where there is free access of air. Exposure of the plants to cold air has been found to materially check an outbreak of Mildew; but the only method that can be relied upon is to remove the diseased plants as quickly as possible from among the healthy ones, taking care not to leave infected stumps of old plants in the ground. It is necessary also to keep the ground clear of Groundsel, Thistles, and other weeds belonging to the order *Compositæ*, since they also are food-plants of this Mildew.

LETTUCE FLY (*Anthomyia Lactucæ*). The larva is at times very destructive to the seed of the garden Lettuce. The eggs are laid on the flower, and the yellowish-white maggots bore into the seed-vessels, eat the seed, and then go on to repeat the process. They change into chestnut-brown oval pupæ in the flower-head, or in the ground, towards the end of September or in October. The flies appear in the next spring or summer, and are about the size of house flies. The female is grey, with a chestnut stripe down the face, and blackish legs. The male is black, with the face chestnut-brown; four pale stripes on the front of the thorax; the rings of the abdomen grey, with dark base and triangular spot; legs black, and wings dark.

Prevention. Care should be taken to insure that the seed, when sown, is free from pupæ. Infected crops, when cleared off the ground, should be burned.

LETTUCE, LAMB'S. *See* **Corn Salad.**

LEUCADENDRON (from *leukos*, white, and *dendron*, a tree; the Wittebroom, or Silver-tree of the Cape colonists). ORD. *Proteaceæ*. A rather large genus (about seventy species have been described) of woolly or glabrous shrubs or trees, entirely confined to Southern Africa. Flowers greenish or yellowish, in heads at the tips of the shoots, sometimes rendered conspicuous by the large leaf-like coloured bracts which surround them. Leaves coriaceous, entire. The following is the most ornamental and best known species; several have been introduced, but very few are now in cultivation.

L. argenteum (silvery).* Silver-tree. *fl.* yellow, in terminal heads, and of but little beauty. August. *l.* closely set upon the stems, lanceolate, 4in. to 6in. long, 1in. broad, of a very beautiful silvery white. *h.* 15ft. 1693. A very handsome tree, too rarely seen in cultivation. The dried leaves are imported, and largely used in the making of wreaths, &c. (B. R. 979.)

LEUCADENDRON (of Salisbury). A synonym of **Leucospermum** (which *see*).

LEUCHTENBERGIA (named after Prince Leuchtenberg). ORD. *Cacteæ*. A monotypic genus, the species being a greenhouse succulent. Flowers produced at the top of the plant, among the younger mamillæ, very like those of *Cereus*, but having a more cylindrical perianth tube, and the stamens growing to its inside as far as the bottom of the petals, after which they converge and meet in the centre, closing up the mouth of the tube. The species, like most other succulents, require careful watering. For general culture, *see* **Mamillaria.**

L. principis (princely). *fl.* rich clear yellow, large, usually solitary, produced near the axils of the tubercles. *l.* glaucous green, succulent, 4in. or 5in. long, triangular, truncated at the apex, and there bearing six or seven long chaffy, or almost horny linear, or subulate flexuose scales, of which the centre one is almost as long as the mamillæ, and the others form a whorl round the centre. Stem about as thick as a man's arm, hard and woody, covered with the remains of decayed mamillæ. Mexico, 1847. (B. M. 4393.)

LEUCOCARPUS (from *leukos*, white, and *karpos*, a fruit; alluding to the colour of the berries). ORD. *Scrophularineæ*. A monotypic genus, the species being a tall,

Leucocarpus—*continued.*

puberulous or glabrous, greenhouse herb, very ornamental when laden with its white fruits. For culture, *see* **Mimulus.**

L. alatus (winged). *fl.*, corolla yellow, bilabiate, with an elongated tube; stamens included; filaments glabrous, yellow; peduncles axillary, opposite. September. *l.* 10in. long, 2in. broad, opposite, spreading horizontally, acutely serrulate, lanceolate, attenuated and entire towards the base, at their origin dilated and stem-clasping, much veined and reticulated. Branches decussate, widely spreading. Stem 2ft. to 2½ft. high, erect, four-sided and four-winged. Mexico. SYN. *Mimulus perfoliatus* (under which name it is figured in B. M. 3067).

LEUCOCORYNE (from *leukos*, white, and *koryne*, a club; referring to the sterile anthers). ORD. *Liliaceæ.*

FIG. 396. LEUCOCORYNE IXIOIDES.

A genus comprising three or four species of pretty half-hardy bulbous plants, natives of Chili. Flowers

FIG. 397. DETACHED FLOWERS OF TWO VARIETIES OF LEUCOCORYNE IXIOIDES, one with entire segments, the other with toothed ones.

Leucocoryne—*continued.*

white or blue, in terminal few-flowered umbels, pedicellate; perianth salver-shaped; scapes simple, leafless. Leaves radical, narrow, linear, channelled. Bulbs tunicated. For culture, *see* **Ixia.** The following are the best known species:

L. alliacea (Onion-like). *fl.*, perianth pale lilac, eight to nine lines long; segments linear-acute, longer than the tube. *l.*, many, firm, green, 6in. to 8in. long, scarcely one line broad. *h.* 6in. to 12in. Chili.

L. ixioides (Ixia-like). *fl.* white or pale blue; umbels from four to six-flowered. August. *l.* about 1ft. long. *h.* 1ft. Chili, 1826. SYN. *L. odorata.* See Figs. 396 and 397. (B. R. 1293; B. M. 2832, under name of *Brodiæa ixioides.*)

L. odorata (sweet-scented). A synonym of *L. ixioides.*

FIG. 398. LEUCOIUM ÆSTIVUM.

LEUCOIUM (*Leucoion*, the old Greek name used by Theophrastus, from *leukos*, white, and *ion*, a violet; referring to the colour and fragrance of the flowers). Snowflake. Including *Acis* and *Erinosma.* ORD. *Amaryllideæ.* A genus comprising about nine species of ornamental hardy bulbs, natives of central Europe and the Mediterranean region, and closely allied to *Galanthus.* Flowers few, in umbels, or reduced to one, often pendulous; scape fistulous. Leaves few, sometimes narrow, linear, sometimes plane, loriform. There are but a few of the species in cultivation. They thrive in a free,

Leucoium—*continued.*

open, rich soil. If very heavy, an addition of a little peat or leaf mould is recommended. Increased by offsets, which should be secured as soon as possible after the foliage ripens. Any of the species of *Leucoium* are admirably adapted for naturalising in the same way as the Snowdrop, which they resemble in general appearance, if a sufficient number of bulbs is obtainable.

L. æstivum (summer).* Summer Snowflake. *fl.* pure white, about 1in. long, the tip of each perianth segment marked with green, both inside and out; drooping; clusters from four to eight-flowered. Spring and early summer. *l.* linear, obtuse, with a blunt keel. *h.* 1½ft. Central and South Europe (South of England). An exceedingly pretty plant, and of easy culture in any ordinary garden soil. See Fig. 398. (B. M. 1210.)

L. autumnale (autumnal). This is the correct name of the plant described in this work as *Acis autumnalis*. (B. M. 960.)

L. Hernandezii (Hernandez's).* *fl.* white, about ½in. long; perianth segments oblong, obtuse, marked with a green spot; stem one to three-flowered. Summer. *l.* linear, about ¼in. broad, flat, obtuse. *h.* 1ft. to 1½ft. Majorca. This species is known in gardens as *L. pulchellum*. It is generally supposed to be a variety of *L. æstivum*, but is not so ornamental, and is, consequently, less grown. (L. B. C. 1478.)

L. pulchellum (neat). A garden name of *L. Hernandezii*.

FIG. 399. LEUCOIUM VERNUM, showing Habit and detached Flower.

L. vernum (spring).* Spring Snowflake. *fl.* white, with a green spot on the tips of the segments, solitary, drooping, fragrant. Spring. *l.* few, linear. *h.* 4in. to 6in. Central Europe, 1596. SYN. *Erinosma vernum*. A very handsome species, well suited for either rockwork or the border. See Fig. 399. (B. M. 46.) A variety named *biflorum* is sometimes seen in gardens. (B. M. 1993).

LEUCOLÆNA. A synonym of **Xanthosia** (which *see*).

LEUCOPOGON (from *leucos*, white, and *pogon*, a beard; referring to the limb of the corolla being bearded with white hairs). ORD. *Epacrideæ*. A genus comprising about 130 species of handsome greenhouse evergreen shrubs, rarely trees, of which 118 are from Australia, and the rest from New Zealand, the Pacific Islands, and the Malayan Archipelago. Flowers white, small, in terminal axillary spikes, rarely racemes. Leaves variable, sessile or petiolate, striate-nerved. All the species here described are Australian. For culture, *see* **Epacris.**

L. amplexicaulis (stem-clasping). *fl.* white; spikes slender, interrupted, terminal and in the upper axils, longer than the leaves; bracts lanceolate, leaf-like, and nearly as long as the flowers. June. *l.* sessile, stem-clasping, spreading, cordate-ovate, acute, convex or with recurved margins, ciliate, striate on both sides. *h.* 3ft. 1815. SYN. *Styphelia amplexicaulis*.

L. australis (Southern).* *fl.* pure white; spikes many-flowered, erect, axillary. Winter and early spring. *l.* linear-lanceolate, more than 1in. long, with recurved smooth margins. *h.* 2ft. to 4ft.

L. collinus (hill-loving). *fl.* white; spikes short and dense, terminal or in the uppermost axils, or terminating short, leafy, axillary branches. May. *l.* usually oblong or linear, obtuse or with a short point. *h.* 2ft. 1824.

Leucopogon—*continued.*

L. ericoides (Heath-like). *fl.* white, few together, in close axillary clusters or spikes, rarely exceeding the leaves. June. *l.* mostly oblong-linear, mucronate, but sometimes narrow and acute; margins revolute or recurved. *h.* 5ft. 1815.

L. interruptus (interrupted). *fl.* white, small, rather numerous; spikes slender and interrupted, but not exceeding the leaves, solitary, or two or three together at the ends of the branches. June. *l.* mostly crowded at the end of each year's shoot, so as to appear verticillate, from almost oval to oblong-elliptical, obtuse, or with a minute callous point, flat, or nearly so, finely nerved. *h.* 2ft. 1826.

L. juniperinus (Juniper-like). *fl.* white, almost sessile, solitary or twin. April to June. *l.* divaricate, lanceolate-linear, ending in a setaceous mucrone, with recurved, slightly denticulated margins. *h.* 3ft. to 4ft. 1804. (L. B. C. 447.)

L. lanceolatus (lanceolate). *fl.* white; spikes nodding, aggregate, axillary, many-flowered. Winter to summer. *l.* lanceolate, flat, dark green. *h.* 6ft. to 12ft. 1790. (B. M. 3162.)

L. Richei (Riche's).* *fl.* pure white; spikes erect, many-flowered, a little shorter than the leaves. Winter and spring. *l.* glabrous, oblong-lanceolate, hardly 1in. long, broadest beyond the middle, convex above, with sub-recurved margins. *h.* 3ft. to 4ft. 1822. (B. M. 3251.)

L. verticillatus (whorled).* *fl.* white or pink; spikes nearly terminal, aggregate. Summer. *l.* oblong-lanceolate, attenuated at the apex, disposed in whorls 2in. to 4in. long, of a lovely rose-colour when young. *h.* 3ft. to 6ft. 1837. (B. M. 6366.)

L. virgatus (twiggy). *fl.* white; spikes terminal and axillary, almost aggregate, few-flowered. Summer. *l.* linear-lanceolate, attenuated at the apex, very acute, convexly concave, imbricated and spreading, with ciliated margins. *h.* 2ft. 1824.

LEUCOSPERMUM (from *leukos*, white, and *sperma*, a seed; in allusion to the downy seeds). SYNS. *Diastella*, *Leucadendron* (of Salisbury). ORD. *Proteaceæ*. This genus comprises about twenty-four species of greenhouse evergreen shrubs or small trees, natives of South Africa. Flowers solitary under each bract, sessile, capitate. Leaves sessile, coriaceous, often toothed at the apex, and generally covered with silky hairs. For culture, *see* **Protea.**

L. grandiflorum (large-flowered). *fl.* yellow; style longer than the very villous flower; stigma equal-sided, oblong. May to July. *l.* oblong-lanceolate, three-toothed and entire. Branches very hairy. *h.* 4ft. 1800.

L. lineare (linear-leaved). *fl.* yellow; style longer than the hairy flower; stigma gibbous on one side; involucre downy. August and September. *l.* linear, entire. *h.* 4ft. 1774.

L. medium (intermediate). *fl.* orange; drooping style nearly twice as long as the hairy flower; stigma gibbous. May and June. *l.* linear-oblong, entire, two or three-toothed. *h.* 3ft. 1794. SYN. *Protea formosa* (under which name it is figured in A. B. R. 17).

LEUCOSTEGIA. Now included under **Davallia** (which *see*).

LEUCOTHOË (the name of a sea-goddess in the Greek mythology). ORD. *Ericaceæ*. A genus containing about eight species of handsome hardy shrubs, natives of North America and Japan. Flowers white, disposed in terminal and axillary paniculate racemes. Leaves alternate, petiolate, oblong or lanceolate, serrulate, persistent or deciduous, penninerved. Leucothoës require a peaty soil, or one composed of peat and leaf mould. They are amongst the most desirable of hardy ericaceous shrubs. Propagated by seeds, which should be covered very lightly; by layers; and by divisions of established plants, in autumn or winter. Leucothoës, like many other shrubs of a similar character, do not grow very fast when young, or before being well established.

L. acuminata (acuminate). *fl.* white, borne in great profusion; corolla cylindrically ovate, pedicellate, drooping; racemes axillary, very short, corymbose, nearly naked. June. *l.* ovate-lanceolate, gradually narrowed to the top, acuminated, quite entire or unequally serrated, glabrous, shining, reticulately veined, leathery. *h.* 2ft. to 3ft. North America, 1765. SYN. *Andromeda acuminata* (under which name it is figured in S. E. B. 89).

L. axillaris (axil-flowering).* *fl.* white; corolla ovate-cylindrical; racemes axillary, spicate, sessile, beset with scaly bracts. May. *l.* oblong or oval, acuminated, covered with scattered glandular

Leucothoe—*continued.*

hairs on the under surface. Young branches clothed with powdery down. *h.* 2ft. to 3ft. North America, 1765.

L. Catesbæi (Catesby's). *fl.* white, exhaling the unpleasant odour of Chestnut blossoms; sepals ovate-oblong, not overlapping in the flower. May. *l.* ovate-lanceolate to lanceolate, and tapering into a long and slender acumination, serrulate throughout, conspicuously petioled. *h.* 2ft. to 4ft. North America. SYNS. *Andromeda Catesbæi* (B. M. 1955) and *A. axillaris* (B. M. 2357).

L. Davisiæ (Mrs. Davis').* *fl.* white, recurved, pendulous; racemes nearly sessile, many-flowered, erect, forming close terminal panicles. *l.* oblong, obtuse at both ends, obscurely serrulate, bright green. *h.* 3ft. to 5ft. California, 1853. (B. M. 6247.)

L. racemosa (racemose).* *fl.* white; racemes or spikes mostly solitary, erect or ascending; sepals lanceolate-ovate, very acute. May and June. *l.* oblong or oval-lanceolate, acute, serrulate, somewhat pubescent when young, and on the midrib beneath. *h.* 4ft. to 10ft. North America. (W. D. B. 36, under name of *Andromeda spicata.*)

L. recurva (recurved). *fl.* white; racemes spreading or recurved; sepals ovate. June. *l.* more acuminate than in *L. racemosa.* North America. This species is dwarfer and more straggling than *L. racemosa.* SYN. *Andromeda recurva.*

LEUZEA (named in honour of De Leuze, a friend of De Candolle). SYN. *Rhacoma.* ORD. *Compositæ.* A genus comprising three species of hardy herbaceous perennials, one broadly dispersed through the western region of the Mediterranean, another from Portugal, and the third from Spain. Flower-heads purplish, large; involucre ovoid or sub-globose, shining; receptacle densely subpaleaceous, setose. Leaves alternate or radical, dentate or pinnatifid, hoary-tomentose underneath. Only one species—*L. conifera*—is in cultivation. This is a pretty, rather strong-growing, interesting plant. It requires an ordinary garden soil, and may be increased by seeds, or by divisions of the plants, in spring.

L. conifera (cone-bearing). *fl.-heads* purple; involucre scaly, glabrous. July. *l.* lanceolate. Stem simple, one-headed. *h.* 9in. South Europe, 1683.

LEVELLING. A scientific knowledge of Levelling, sufficiently exact for land surveying, is rarely expected of a gardener; but, in the execution of ordinary ground work, an acquaintance with the principles, and the method of applying them according to requirements, will be of the utmost importance. Levelling is a term similarly applied to the equalising of soil, either on a horizontal or an inclined plane surface. When the preparation of land, by digging, for the reception of seeds or crops, is the only object in view, the surface will generally be rendered level enough with the spade or rake, if their use is guided under the eye of a practical workman. In the formation of an edging of any description, the making or gravelling of walks, turf-laying on lawns, draining operations, &c., some method, in accordance with scientific teaching, must be adopted, if satisfactory results would be attained. The difference in permanent work, as above named, executed on a definite plan, regarding the Levelling or the natural inclination of the soil, and that performed in a haphazard way, is widely marked, even on its completion, and more so when tested, afterwards, by heavy rains. Where the general surface of garden land is flat, or nearly so, Levelling is of greater importance, in order to dispose of any superfluous rain or other water which may collect. A slight incline will cause water to flow, but an obstruction to the same extent will similarly check its course; and, as inequalities of this sort cannot with certainty be avoided where the uses of levels are ignored, their value in securing a uniform surface on any plane will be readily seen. Reference may first be made to the theodolite, a rather expensive instrument, principally used in land surveying, for measuring the horizontal or the vertical angle between two distant objects. It consists of a small telescope, which may be raised or lowered according as the disposition of the ground may require, the angle in either direction being ascertained by two graduated circles, which are attached. The in-

Levelling—*continued.*

strument is provided with a spirit-level and adjusting screws, for fixing its proper position. On ascertaining the apparent level at the opposite end, through the telescope, the amount of rise or fall in the distance will be indicated, and a calculation will show how much it is in a given distance. Far less expensive, and, moreover, invaluable instruments for Levelling purposes generally, are a good spirit-level, an ordinary straight-edge, and three borning-rods. The spirit-level, in its simple form, consists of a glass cylinder tube, filled with spirit, except a very small space, which is occupied by a bubble of air. The tube is sometimes fixed in the centre of a straight-edge; but this plan is not to be recommended, on account of the liability of the latter to become crooked. A more certain method is that of fixing it exactly in the middle of a piece of hard wood, having a plane surface on all sides. The air-bubble, being lighter than spirit, will rise in the tube, whenever either end is placed above the horizontal line. A straight-edge should be made of a strip of wood, not liable to warp easily, and its edges should be planed straight and even as frequently as they get the least otherwise. Borning-rods are about 4ft. long, and have a strip of wood placed exactly at right angles across their tops, and painted respectively red, white, and either black or blue, in order to distinguish each readily from the other. When made of an equal length, and placed in line, all the tops must run evenly when viewed from either end. Sometimes one rod is made longer than the others, and a very small hole is bored through the strip at the exact height of the others, so that the eye may not be misguided. By sufficient practice, Levelling may be very exactly carried out with the borning-rods, after the spirit-level and straight-edge have aided in fixing the proper position for the pegs at the two ends. An insertion of ordinary wooden pegs, at distances of about 8ft. apart, will be a sufficient guide for forming a dead level surface, or for equalising a fall throughout a given length. There are other forms of levels, but those referred to will be found sufficient for all gardening purposes.

LEVISTICUM (a corruption of *Ligustikon*, the name given by Dioscorides to another Umbellifer). ORD. *Umbelliferæ.* A monotypic genus. *L. officinale* is a hardy herbaceous perennial, with yellow flowers, and ternately-decompound leaves, having deeply-toothed

FIG. 400. LEWISIA REDIVIVA.

Levisticum—*continued.*

obovate-cuneate leaflets. It is of no horticultural value, and is rarely seen out of botanic gardens. A form having variegated leaves is offered by Continental seedsmen.

LEWISIA (named after Captain M. Lewis, 1774-1809, who accompanied Captain Clarke to the Rocky Mountains of North America). ORD. *Portulaceæ*. A monotypic genus, the species being a very curious and handsome hardy herbaceous perennial, well adapted for growing on rockwork, in crevices where the roots can obtain plenty of moisture without stagnancy. It flourishes best in a sunny spot; indeed, this is the only situation in which it will produce flowers. During hot summers, Lewisias should have a daily watering. Propagated by seeds; or by divisions of the roots, in spring.

L. rediviva (revived). *fl.* pink, with a nearly white centre, from 3in. to 4in. across; calyx finely veined with red; scapes one-flowered. Summer. *l.* in rosettes, linear, bluntish, succulent, withering on the appearance of the flowers. Roots edible, tapering, fleshy. *h.* 3in. to 4in. North-Western America, 1826. See Fig. 400. (B. M. 5395.)

LEYCESTERIA (named after William Leycester, once Chief Judge of the principal native court under the Bengal Presidency). ORD. *Caprifoliaceæ*. A monotypic genus, the species being a very handsome hardy, or nearly hardy, deciduous shrub, with a rambling habit and elongated fistular branches, which rise from scaly buds. It is a distinct and interesting plant, well deserving of a much more extended cultivation than it now enjoys. *L. formosa* thrives in any moderately good garden soil, and is propagated by cuttings of the short young shoots, made in spring; by older ones, made in autumn, and placed under a handlight; or by seeds, sown in spring.

FIG. 401. FLOWERING BRANCH OF LEYCESTERIA FORMOSA.

L. formosa (handsome).* *fl.* white, with a tinge of purple, middle-sized, sessile, in fascicles, disposed in approximate whorls of fives and sixes, the whole forming short leafy drooping racemes, which terminate the branches and branchlets; corolla funnel-shaped, having the tube gibbous above the base, and the limb campanulate and divided into five ovate nearly equal lobes; bracts large, leafy, purplish, pubescent, generally six under each whorl of flowers. Summer. *l.* opposite, ovate-lanceolate, acuminated, petiolate, smooth, entire. *h.* 4ft. to 6ft. Temperate Himalayas, 1824. Pheasants are said to be fond of the fruit of this species, which is recommended as a good covert plant. See Fig. 401. (B. M. 3699.)

LEYSSERA (named after T. W. Leysser, 1731-1815, a German botanist). Including *Longchampia*. SYNS. *Asteropterus*, *Callicornia*. ORD. *Compositæ*. A genus comprising four species of greenhouse evergreen herbs or sub-shrubs, three of which inhabit South Africa, and the other extends from Southern Spain,

Leyssera—*continued.*

through North Africa, as far as Western Asia. Flower-heads yellow, on long peduncles; involucre turbinate or campanulate. Leaves narrow, linear, or subulate, entire. Leysseras thrive in a compost of rough peat and loam. Propagated by half-ripened cuttings, inserted in sandy soil, during summer; or by seed.

L. capillifolia (hair-leaved). *fl.-heads* yellow; peduncles naked, axillary, one-headed. June. *l.* woolly, subulate, filiform. Stem filiform, branched. *h.* 6in. Barbary, 1822.

L. gnaphalioides (Gnaphalium-like). *fl.-heads* orange; scales of involucre lanceolate. July to September. *l.* linear, subulate, ciliate, rough. *h.* 2ft. Cape of Good Hope, 1774.

L. squarrosa (squarrose). A synonym of *Helipterum gnaphalioides*.

LHOTZKYA (named after Dr. John Lhotzky, a Viennese botanist, who travelled in Australia). ORD. *Myrtaceæ*. A genus comprising eight species of greenhouse evergreen Heath-like shrubs, limited to Australia. Flowers sessile or shortly pedicellate, solitary in each axil along the branches, or forming terminal leafy heads. Leaves scattered or rarely opposite, semi-terete, or three or four-angled, rigid, entire, glabrous or pubescent. *G. acutifolia* and *G. violacea*, the species best known to cultivation, thrive in a compost of loam, with the addition of a little peat and sand. Propagation is effected by cuttings, made from the young shoots when the base is a little firm, and inserted in sand, under a glass.

L. acutifolia (acute-leaved). *fl.* white or yellowish, nearly sessile along the branches. June. *l.* scattered, crowded, linear, mucronate, mostly about ¼in. long, prominently keeled beneath. *h.* 1½ft. 1843. Plant erect, pubescent.

L. violacea (purple). *fl.* purplish, in the upper axils, forming dense terminal heads. June. *l.* alternate or scattered, oblong, very obtuse, about ¼in. long, concave above, convex beneath. *h.* 1½ft. 1843. Plant hairy, erect, bushy.

LIABUM (probably a meaningless name, as is frequent with those given by Adanson). Including *Paranephelius* and *Sinclairia*. SYNS. *Andromachia* and *Starkea*. ORD. *Compositæ*. A genus comprising about forty species of herbs or shrubs, natives of tropical and subtropical America, and the Andes. Flower-heads yellow, radiating; involucre campanulate or hemispherical; achenes villous or rarely glabrous. Leaves opposite, entire, dentate or lobed. *L. uniflorum*, probably the only species yet in cultivation, is a half-hardy alpine. It requires a compost of sandy loam and leaf mould, to which a little peat may be added. Propagated by divisions, in spring.

L. uniflorum (one-flowered). *fl.-heads* brilliant golden-yellow, from 2in. to 3½in. across. *l.* obovate, rugose, sub-pinnatifidly lobed. Peruvian Andes, 1870. (B. M. 5826, under name of *Paranephelius uniflorus*.)

LIATRIS (derivation unexplained). Blazing Star; Button Snake-Root. ORD. *Compositæ*. A genus comprising about sixteen species of hardy perennial herbs, natives of North America. Flower-heads purplish or white, handsome, spicate, racemose, or panicled; scales of the involucre imbricated, appressed; receptacles naked; achenes slender. Leaves alternate or scattered, narrow, entire, one to five-nerved. The species form exceedingly pretty border plants, thriving in any moderately good light soil. Propagated by divisions, in spring; or by seeds, sown usually early in autumn.

L. elegans (elegant). *fl.-heads* purplish, disposed in spikes 1ft. or more in length. Summer and autumn. *l.* spotted, glabrous; radical ones spathulate, three to five-nerved; upper ones ligulate, short, sometimes spiny tipped. *h.* 2ft. to 4ft. 1787. (B. R. 267.)

L. graminifolia (grass-leaved). *fl.-heads* purple, in the axils of the upper leaves or bracts, loosely spicate; involucre about six-flowered. September. *l.* remotely dotted, acuminated, ciliate at base. Stem simple. Root tuberous. *h.* 2ft. 1838.

L. g. dubia (doubtful). A variety with an upright and virgate spike, with many approximate, rather large heads, or occasionally racemiform; bracts of the involucre narrower and thinner than in the type. (B. M. 3829, under name of *L. propinqua*.)

Liatris—*continued.*

L. g. pilosa (pilose). A variety having unusually narrow involucral scales. (B. R. 595.)

L. odoratissima. *See* **Trilisa odoratissima.**

FIG. 402. LIATRIS SPICATA, showing Habit and detached Flower-head.

L. pycnostachya (dense-spiked). *fl.-heads* pale purple, in a dense cylindrical spike, 1ft. to 1½ft. long. Summer and autumn. *l.* rigid, sessile; lower ones narrow, lanceolate, blunt, five to seven-nerved; upper ones short, crowded, narrow-ligulate, acuminated. Stems thick, leafy. *h.* 3ft. to 5ft. 1732. A very desirable plant, and one of the most useful for growing on dry soils where few other things will live. It is best treated as a biennial, by sowing the seeds in spring.

L. scariosa (scarious). *fl.-heads* purple, almost 2in. in diameter, disposed in an elongated corymb. September. *l.* very long and narrow. *h.* 2ft. 1739. (B. M. 1709; B. R. 1654.)

L. spicata (spiked). *fl.-heads* purple, sessile, in spikes from 6in. to 15in. long; involucral scales oblong or oval, appressed. September. *l.* lanceolate, ciliated at base, acute. *h.* 1ft. to 2ft. 1732. See Fig. 402. (B. M. 1411.)

L. squarrosa (squarrose). *fl.-heads* bright purple, rough, shortly stalked, on leafy and downy stems; involucral scales, with elongated and leaflike tips. Summer and autumn. *l.*, radical ones long, about ½in. wide, three to five-nerved; stem ones ligulate, rigid. *h.* 2ft. to 3ft. 1732.

LIBER. "The innermost and youngest circle next the young wood is the Liber, or inner bark, formed of long, tough, woody tissue, called bast-cells" (Bentham).

LIBERTIA (named after Marie A. Libert, a Belgian lady, who wrote on botanical subjects). SYNS. *Nematostigma*, *Renealmia* (of Robert Brown). ORD. *Irideæ*. A genus of eight species of ornamental, hardy or nearly hardy, perennial herbs, inhabiting Chili, Australia, and New Zealand. Perianth white or blue; inflorescence loosely corymbose-paniculate; spathes few-flowered. Leaves, radical ones distichous, narrow-linear, firm, densely crowded; stem ones terete. The majority of the species will prove tolerably hardy if provided with a slight protection in winter. All thrive on warm borders of light soil. Propagated by seeds, sown as described for **Iris** (which *see*); or by careful divisions, in spring.

L. formosa (handsome). *fl.* white, capitate; perianth six-parted, rotate, glabrous; tube none; pedicels light green; outer spathe bivalvular, repeated on the inner flowers, which expand in succession. May. *l.*, root ones 6in. to 12in. long, ¼in. to ½in. broad, linear-sword-shaped, acute; stem ones few, sheathing, uppermost about 1½in. long. Stem 16in. high, simple. Chili, 1831. See Fig. 403. (B. M. 3294.)

Libertia—*continued.*

FIG. 403. LIBERTIA FORMOSA, showing Habit and Portion of detached Inflorescence.

L. grandiflora (large-flowered). *fl.* pure white, disposed in spike-like panicles about 3ft. high. Summer. *l.* narrow, stout, about 2ft. long, and nearly ½in. broad. New Zealand, 1870.

L. ixioides (Ixia-like). *fl.* white, with pale yellow stamens, numerously disposed in closely-packed panicles. Summer. *l.* linear, rigid, from 1½ft. to 2ft. long, tufted. *h.* 2ft. to 4ft. New Zealand, 1865. Hardy.

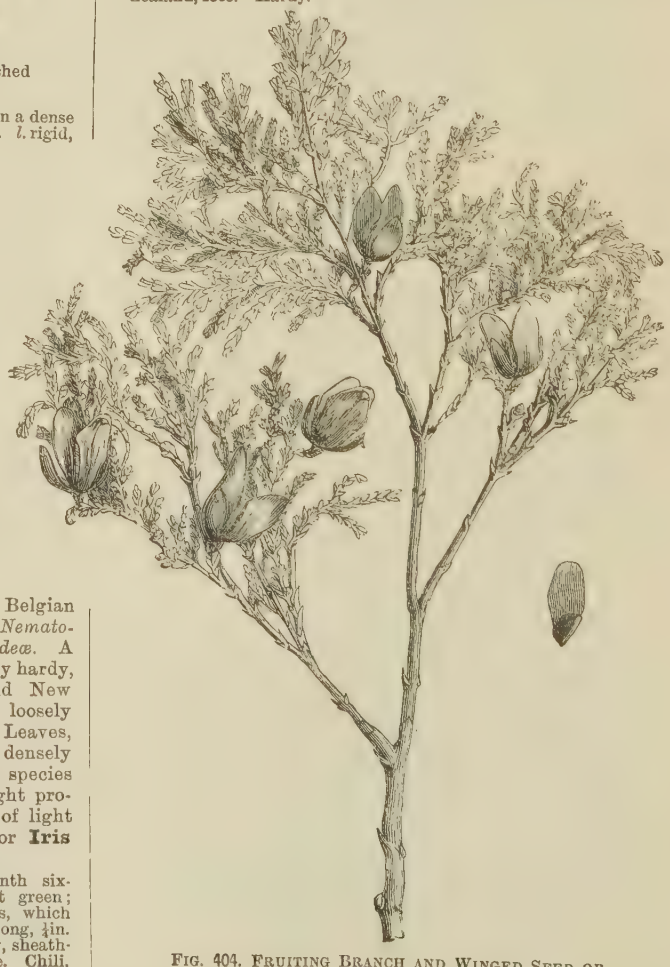


FIG. 404. FRUITING BRANCH AND WINGED SEED OF LIBOCEDRUS CHILENSIS.

Libertia—*continued.*

L. paniculata (panicled). *fl.*, clusters umbel-like; perianth segments ovate, spreading; panicle oblong, loose, and irregular, often occupying half the stem. April. *l.* almost radical, grass-like, flaccid, 9in. to 18in. long, and mostly about ½in. broad. Stem 1ft. to 2ft. high, with sometimes a short leaf below the inflorescence. Australia, 1823. (B. M. 6263.)

L. pulchella (pretty). *fl.*, perianth segments narrower than in *L. paniculata*, and more nearly equal; rachis of the cluster often somewhat elongated, and sometimes a pedunculate cluster from the axil of the same bract; scape or peduncle from under 6in. to nearly 12in. long. April. *l.* rarely 6in. long, and two to three lines broad, often not above half that size. *h.* 1ft. Australia, 1823.

LIBOCEDRUS (from *libanos*, incense, and *Cedrus*, the Cedar; referring to the fragrant wood). Incense Cedar. ORD. *Coniferæ*. A genus comprising eight species of handsome hardy or half-hardy evergreen trees, with the habit of *Thuya* (under which the present genus was formerly included). Two are natives of Chili, two of New Zealand, and one each of New Caledonia, Japan, China, and California. Flowers monœcious, or male and female on same plant, but separate and terminal; male catkins almost cylindrical; female ones solitary and globular. Leaves scale-formed, compressed in opposite pairs, and in four imbricated rows, the under and upper ones much the smallest. Cones oval, more or less obtuse, woody, composed of from four to six scales, which are flat, or slightly concave on the inner face. For culture, *see* **Thuya.**

L. chilensis (Chilian). *l.* glaucous-green, oblong-trigonous, appressed, obtuse. Branches compressed, spreading, pendulous, but somewhat ascending towards the summit, and quite erect at the top. *cones* ½in. long, drooping, on short footstalks. *h.* 60ft. to 80ft. Chili. This handsome, densely-branched, conical tree is not hardy except in favourable situations, and only attains a shrub-like aspect. The wood possesses an aromatic fragrance, and is very hard and yellowish. SYN. *Thuya chilensis*. See Fig. 404. (L. & P. F. G. i. 47.) A variety known as *viridis* is a handsome form of the type, having bright green foliage, and branchlets entirely devoid of glaucous bands.

L. decurrens (decurrent).* *l.* bright rich glossy green, small, linear, scale-like, quadrifariously imbricated, acute at the free apex, with long decurrent base, elongated on the older branches. Branchlets numerous, alternate, and plaited or flattened laterally. *cones* erect, solitary, on the ends of the upper branchlets, 1in. or more long, ½in. wide, olive-brown. *h.* (in its native habitat) 40ft. to 140ft. Sierra Nevada Mountains of California. A handsome, distinct, erect, compact-growing tree, with a stout

FIG. 405. FRUITING BRANCHLET OF LIBOCEDRUS DONIANA.

Libocedrus—*continued.*

trunk, distinguished by its glandless decurrent leaves and columnar habit. SYN. *Thuya gigantea*, of gardens. (W. & F. 1884, 191.)

L. Doniana (Don's). *l.* very like those of *L. chilensis*, but more closely set on the branchlets, and without any silvery line on the under surface. Branches spreading, tortuous, with flattened fern-like branchlets. *h.* 30ft. to 70ft. New Zealand, 1847. A very beautiful species where it can thrive well, but it is exceedingly tender in our climate. SYN. *Thuya Doniana*. See Fig. 405.

L. tetragona (four-sided). *l.* small, ovate, scale-like, obtuse, pale green, imbricated in four rows. Branches spreading, depressed; branchlets tetragonal. *cones* consisting of six coriaceous scales, in three pairs. *h.* 40ft. to 80ft. Patagonia, 1849. A handsome, compact, pyramidal shrub or tree, more hardy than the others generally. It is, however, rarely seen in our gardens. SYN. *Thuya tetragona*. (G. C. 1850, 439.)

LIBONIA (named after M. Libon, a traveller in Brazil). ORD. *Acanthaceæ*. This genus is now included, by Bentham and Hooker, under *Jacobinia;* but, as the plants are well known by the former name, their culture, &c., are here given. Libonias, when well grown, are very ornamental and free-flowering plants for greenhouse decoration. They are readily propagated by cuttings, inserted in any close frame during spring and early summer. *L. floribunda* is a species largely grown for winter flowering—a purpose for which it proves a very useful subject. Old plants, from which it is intended to propagate, should be placed in a little heat, early in spring, to start new growth, and the cuttings should then be inserted in sandy soil, and kept close until rooted. They may be potted off singly afterwards, and grown, throughout the summer, in a frame, where plenty of air may be admitted, to induce a sturdy and short-jointed growth. Turfy loam, with about its bulk of leaf soil, or well-decayed manure, added, is a suitable compost; and 5in. or 6in. pots are generally large enough for the plants to flower in. A light shading may be applied in hot weather; but full sun must be admitted in early autumn, to thoroughly ripen the wood for flowering. Some persons prefer planting out in frames, early in June, in prepared soil, and lifting again in autumn. If kept close for a few days, after being potted up, the plants soon become re-established, and the plan answers well. Old plants may be cut back after flowering, and grown, under similar routine treatment, several years in succession. It is advisable to raise a few young ones annually, for replacing any that become leggy. Libonias require an intermediate temperature when flowering; they must also be kept well watered, or the result will be a loss of nearly all the leaves. Red spider frequently attacks them, and, when once allowed a footing, is only with difficulty eradicated. Frequent syringing throughout the summer will generally prove an effectual preventive against much injury being caused.

L. floribunda (bundle-flowered).* *fl.* scarlet, yellow tipped, tubular, drooping, very abundant; calyx five-cleft; corolla funnel-tubular; limb erect, bilabiate. *l.* elliptic-oblong. Brazil, 1862. A very ornamental plant. (B. H. 1863, 2.)

L. Penrhosiensis (Penrhose).* A very elegant plant, obtained by crossing *L. floribunda* with *Jacobinia* (*Sericographis*) *Ghiesbreghtiana*. It has much brighter and deeper-coloured flowers than its parent, and the leaves are more acute. It is an exceedingly useful decorative plant, freely producing its fine showy flowers, which are of a bright rich crimson, passing into fiery red, in the depth of winter. (R. H. 1876, 50.)

LICHENS. These are thalloid plants, which live attached to stones, or the bark of trees, or on the ground. Their growth is extremely slow, and their period of existence considerable. They consist of two structural elements: (1) Filaments, or hyphæ; (2) green cells, or gonidia (which may be solitary, in groups, or in chains). These elements may be arranged in layers, or irregularly intermixed. In form, Lichens present the following modifications, viz.: (1) Crustaceous, in which the whole under surface is firmly adherent to the body upon which it grows; (2) Foliaceous are attached by many small processes from the under side, called rhizines; (3) Fruticose generally

Lichens—*continued.*

consist of slender branches, and are attached by one point only; (4) Gelatinous, so called from the nature of their substance when moist. Lichens are reproduced by spores, borne, generally, eight together, in club-shaped filaments (asci), which are found in large numbers, together with hairs (paraphyses), in external receptacles. In addition to these, other receptacles are formed, called spermagonia, which contain filaments (sterigmata), bearing short rod-like bodies (spermatia). Similar cavities bear larger spore-like bodies, called pyenidia, whose precise nature, as well as that of the spermatia, is not known. A second method of reproduction is by soredia, which consists of one or more gonidia, surrounded by hyphæ. The whole, or only a part, of the Lichen thallus can thus be converted into a powdery mass. The exact relation of the hyphæ to the gonidia is still disputed. Some writers assert that the gonidia are produced by the hyphæ; others (of whom Schwendener was the leader) say that the gonidia are Algæ, upon which fungi (the hyphæ) are growing parasitically. This differs from parasitism in general, inasmuch as the host is not destroyed, but seems to profit by the union. Many Lichens furnish excellent dyes, *e.g.*, *Roccella tinctoria*, from which litmus is obtained. *Cladonia rangiferina* supplies the reindeer with food. Lichens are, in some cases, useful as food or medicine—*e.g.*, Iceland Moss (*Cetraria islandica*), —but their principal value consists in their properties as dyes. *Lecanora esculenta* is frequently met with in immense quantities in the most arid, desert regions of Asia and North Africa; it occurs in rounded masses about the size of a filbert, and is largely used as food. It possesses, too, a peculiar interest, on account of its being supposed, by some commentators, to be the "manna" which fed the children of Israel during their wanderings in the wilderness.

"Lichens are not parasitic; but when they clothe trees they impede the circulation of air, and hasten decay. They further intercept light when enveloping young shoots, and interfere with the development of cambium and the evolution of the foliage" (Hooker).

LICHTENSTEINIA. A synonym of **Ornithoglossum** (which *see*).

LICUALA (from its native name in the Moluccas). SYN. *Pericycla.* ORD. *Palmæ.* A genus comprising about thirty species of dwarf stove palms, natives of Eastern tropical Asia, the Malayan Archipelago, New Guinea, and Northern Australia. Flower-spikes branching, with numerous incomplete spathes. Leaves terminal, fan-shaped, with prickly stalks, the prickles being conical, or often hooked. The species thrive in a compost of two parts peat and one of sandy loam. A strong, moist heat is most essential to success. Propagated by seeds, sown in a sandy soil, and placed in a strong, moist, bottom heat.

L. acutifida (sharply-divided). This species yields the walking-sticks known by the name of Penang Lawyers. It is a native of Pulo Penang, where it grows to a height of about 5ft., its stems being about 1in. in diameter, except at the base, where they are considerably thicker.

L. elegans (elegant).* *l.* fan-shaped, split down to the petiole; segments plaited, præmorse at the ends, about 1½ft. long, light shining green; petiole 2ft. to 3ft. long. Sumatra.

L. grandis (great).* *fl.* ¼in. long; spadices several, rising from among the leaves, and nearly as long as they are; spathes at base of panicles, two or more, 2in. to 3in. long, lanceolate, acute, brown, striated. February. *l.* about twenty in the crown, deep bright green; petiole 2½ft. to 3ft. long, slender, spiny; blade 3ft. in diameter, about 2ft. long, orbicular or semi-orbicular, concave, closely plaited, and a little wavy; margins cleft into bifid lobes, about 1in. long; lobules of the lobes very obtuse. Trunk 3½ft. to base of leaves, 10in. in circumference. *h.* 6ft. New Britain. (B. M. 6704.) SYN. *Pritchardia grandis.*

L. horrida (horrid). *l.* dark green, fan-shaped, large, plaited; petioles stout, armed at the edges with very stout, formidable spines. Indian Archipelago. A handsome species, resembling *L. elegans.*

L. peltata (peltate). *fl.* obovate. *l.* digitately fan-shaped, peltate; leaflets long, cuneated, many-nerved, middle one

Licuala—*continued.*

broadest, sharply bifid and toothed; petioles prickly on margins. *h.* 15ft. India.

L. Rumphii (Rumph's). *l.* palmate; segments linear, toothed, truncate at end. Stem spiny. *h.* 6ft. Moluccas, Borneo, 1802. SYN. *L. spinosa.*

L. spinosa (spiny). A synonym of *L. Rumphii.*

LIEBIGIA. Now included under *Chirita.*

LIETZIA (named after A. Lietze, a nurseryman at Rio Janeiro). ORD. *Gesneraceæ.* A remarkable and handsome stove tuberous-rooted plant. Corolla tubular, campanulate, widely gaping; upper lip erect, lower one somewhat uneven and obscurely lobed. The species requires a well-drained compost of light fibrous loam, leaf mould, and sand. Propagated by seeds, sown in early spring, in heat; by cuttings, inserted in sand, under a glass, in bottom heat; or by tubers, which must be kept dry in winter, and potted in March.

FIG. 406. LIETZIA BRASILIENSIS, showing Habit, and detached Leaf (reduced), Flower, and Capsule, with its persistent Calyx (natural size).

L. brasiliensis (Brazilian). *fl.* green, richly mottled with brown; stamens much exserted; racemes terminal, many-flowered. *l.* hairy, lanceolate, tapering to both ends, opposite, serrated. *h.* 1ft. to 1½ft. Brazil, 1880. See Fig. 406. (R. G. 1005.)

LIEVENA. A synonym of **Quesnelia** (which *see*).

LIGATURES. In nearly all the methods of budding and grafting, a Ligature, or bandage, is necessary for keeping the bud or scion firmly on the stock, and preserving the separated tissues from the action of the atmosphere, which otherwise would soon have an injurious effect. The sort of Ligature, and its strength, depend a good deal on what it has to bind. When stocks are large, and possibly grafted on a system requiring splitting, the Ligature must be strong, and bound tightly; but when the bark only is raised, a pressure sufficient to keep the parts slightly compressed will be enough. Various substances are used for Ligatures, the best being those which expand and contract least under the influence of changeable weather, and also allow of an expansion in the stock without cutting or injuring it. Woollen thread answers well on small stocks, either for budding or grafting. A good Ligature for bandaging large stocks is lime-tree bark, as prepared for manufacturing ropes. It should be dipped in water, and then divided out; but no material of this description should be twisted before being used. Ordinary Russian mats are very serviceable, as the softer parts of them answer the purpose equally as well for many plants as a more expensive material. A Ligature should be carefully applied with both hands, so soon as possible after the graft or bud is inserted. It should be

Ligatures—*continued.*

rolled spirally round the cut surfaces, and drawn tight enough, at every turn, to keep all the parts firmly in position. Whatever the material used as a Ligature may be, it should be examined occasionally after being applied, and gradually loosened and removed when a complete union of the parts is effected.

LIGERIA A synonym of **Sinningia** (which *see*).

LIGHT. The exposure of plants to Light is one of the chief conditions under which they succeed in making their growth. Growth made in the absence of sufficient solar Light consists of weak, elongated shoots that are unable to perform their proper functions. All vegetable life is in an active state throughout the spring and summer, when the amount of heat and Light is correspondingly great; as both diminish in autumn, growth declines, and many plants remain in a somewhat dormant state until the following year. The amount of Light available in winter needs utilising to the fullest extent for plant cultivation, by keeping the glass in all houses and pits frequently cleaned. Heavy blinds permanently fixed on houses, in summer, often prove injurious, by preventing an amount of Light from entering in cloudy weather that would be most beneficial to the occupants. Plants standing in a dark part of a house will be found to grow weak and drawn, compared with others in the same structure similarly situated except in regard to this important element. Light is most essential to all vegetation, on account of the chemical action it causes in the production of colouring matter in the leaves. It is purposely excluded from many vegetables, by closing their outside leaves together or covering the stems with soil, as the case may be, in order to blanch and render the centre or edible portion tender and available for use.

LIGHTFOOTIA (named in honour of Rev. J. Lightfoot, 1735-1788, author of a Flora of Scotland). ORD. *Campanulaceæ*. A genus of about forty species of greenhouse evergreen small shrubs, or erect annual or branching perennial herbs, natives, for the most part, of the Cape of Good Hope. Flowers blue, white, or rose, small. Leaves alternate, rarely opposite, often fasciculate in the axils, small or narrow, often squarrose, entire or rigidly dentate. Lightfootias thrive in a mixture of loam, peat, and sand. Propagated by cuttings, made of young shoots, and inserted in sand, containing a little peat, under a bell glass; the annuals, by seed, sown in a warm frame, in spring. Probably the species here described are the only ones yet introduced.

L. ciliata (ciliated).* *fl.* bluish, axillary and terminal, in loose racemes at the tops of the branches. July. *l.* alternate, somewhat reflexed, ovate-lanceolate, acute, entire. Stem decumbent, woody at the base, branched. Branches woody, erect, purplish. *h.* 9in. Cape of Good Hope, 1822. SYN. *L. Loddigesii.* (L. B. C. 1038, under name of *L. tenella.*)

L. Loddigesii (Loddiges'). A synonym of *L. ciliata.*

L. oxycoccoides (Oxycoccus-like). *fl.* white, with reddish nerves, axillary and terminal, at the tops of the branches. July. *l.* alternate, reflexed, ovate-lanceolate, acute, thin, denticulated at the base. Stem erect or ascending, much-branched; branches diffuse. *h.* 6in. to 12in. Cape of Good Hope, 1787.

L. sessiliflora (sessile-flowered). *fl.* blue, numerous, terminal and axillary, solitary, racemose. *l.* alternate, rarely opposite, numerous, very narrow, erectish or spreading. Stem ascending or erect, rather woody, mostly simple or branched. *h.* 1ft. to 1½ft. Cape of Good Hope.

L. tenella (delicate). A synonym of *L. ciliata.*

LIGNUM VITÆ. *See* **Guaiacum officinale.**

LIGULARIA (from *ligula*, a strap; referring to the florets). ORD. *Compositæ*. A genus comprising about a score species of hardy herbaceous perennials, with handsome leaves, now included, by Bentham and Hooker, under *Senecio*. Ligularias require generally a free, moist soil, and prefer a rather peaty one. Propagated by divisions, in spring and autumn. Only the undermentioned species are worth growing.

L. japonica (Japanese). *fl.-heads* yellow, small, paniculate. Autumn. *l.* stalked, glabrous, green above, paler beneath; lower ones inciso-palmate, lobes unequally dentate; upper ones undivided, serrate. Japan. SYN. *Erythochæte palmatifida.*

Ligularia—*continued.*

L. Kæmpferi aureo-maculata (Kæmpfer's gold-spotted).* *l.* large, orbicular-cordate, dark green, glabrous, shining, irregularly blotched with yellow, or sometimes with white and rose. Stems thick, fleshy. *h.* 1ft. to 2ft. Japan. SYNS. *Farfugium grande* and *Senecio Kæmpferi aureo-maculata.* (B. M. 5302.)

FIG. 407. LIGULARIA MACROPHYLLA, showing Habit and detached Flower-head.

L. macrophylla (large-leaved). *fl.-heads* yellow, borne in a dense, long, terminal spike. *l.* oval, very large, glaucous. *h.* 3½ft. Caucasus. A very large and vigorous-growing perennial, and an excellent plant for sub-tropical gardening. See Fig. 407.

LIGULATE. Strap-like; having the form of a strap.

LIGUSTICUM (named from the country Liguria, where the officinal Lovage, *L. Levisticum*, abounds). ORD. *Umbelliferæ*. A genus comprising about a score species of glabrous perennial herbs, dispersed over the Northern hemisphere. Flowers in compound umbels, often many-rayed; petals white, or rarely yellowish-white. Fruit ovate or oblong. Leaves pinnately or ternato-pinnately decompound. *L. scoticum* is sometimes employed as a potherb. It will grow in any ordinary soil, but is of no horticultural value.

L. scoticum (Scotch). Lovage. *fl.*, umbels of twelve to twenty rays, with a general involucre of two or three narrow bracts and more numerous ones to the partial umbels. Summer. *l.*, lower ones on long stalks, deeply divided into three, each branch bearing three segments or one deeply three-lobed segment. Stem 1ft. to 2ft. high. Britain, &c.

LIGUSTRINA AMURENSIS. *See* **Syringa amurensis.**

LIGUSTRUM (the old Latin name used by Pliny, probably from *ligare*, to tie; referring to the use made of the flexible shoots). Privet. SYN. *Visiania.* ORD. *Oleaceæ*. A genus comprising about twenty-five species of ornamental, hardy, evergreen or deciduous, glabrous shrubs or small trees, natives of Europe, temperate and tropical Asia, and Australia. Flowers often white, disposed in trichotomous or thyrsoid terminal panicles. Berry scarcely drupaceous. Leaves opposite, entire. The species and varieties are of easy culture in almost any soil and situation, such as the neighbourhood of large towns, where a smoky atmosphere prevails, in the shade, or under the drip of trees. The common Privet grows best in a moist and strong loamy soil, and attains the largest size in an open situation. Propagated by cuttings of the young shoots, or by seeds, in the same manner as advised for the Hawthorn (*see* **Cratægus**). The former method of propagation should be employed with varieties.

L. amurense (Amur). A synonym of *L. Ibota.*

L. angustifolium (narrow-leaved). A garden synonym of *L. Massalongianum.*

Ligustrum—*continued.*

L. californicum robustum variegatum (Californian, robust, variegated). A synonym of *L. ovalifolium variegatum.*

L. compactum (compact). *fl.* white, in compound pyramidal panicles. Summer. *l.* elliptic-lanceolate, glabrous. Himalayas, 1874. SYNS. *L. lancifolium, L. longifolium,* and *L. Simonii.*

L. glabrum (glabrous). A synonym of *L. japonicum.*

L. Ibota (Ibota).* *fl.* white, salver-shaped ; inflorescence spiciform. Summer. Berry round, shining, black. *l.* ovate or elliptic, obtuse, rarely lanceolate; principal nerve hairy beneath. Japan, &c. A pretty shrub, with slender terete twigs. (R. H. 1861, 352, under name of *L. amurense.*)

L. I. villosum (villous). A synonym of *L. sinense.*

L. japonicum (Japanese).* *fl.* white, slightly fragrant. June. *l.* oblong-ovate, somewhat acuminated. *h.* 6ft. to 8ft. Japan, 1845. A robust-growing evergreen shrub, with large coriaceous leaves. SYNS. *L. glabrum, L. Kellermanni, L. Sieboldii, L. syringæflorum.*

L. j. macrophyllum (large-leaved). A form with larger leaves than the type.

L. j. variegatum (variegated). *l.* margined and blotched with creamy-white.

L. Kellermanni (Kellermann's). A synonym of *L. japonicum.*

L. lancifolium (lance-leaved). A synonym of *L. compactum.*

L. longifolium (long-leaved). A synonym of *L. compactum.*

FIG. 408. LIGUSTRUM LUCIDUM, showing Leaf and Portion of Panicle.

L. lucidum (shining).* *fl.* white, in much-spreading panicles. Autumn. *l.* oval, ovate-lanceolate, elliptical, or nearly rotundate. *h.* 8ft. to 12ft. China, 1794. A very pretty evergreen species. SYNS. *L. magnoliæfolium, L. strictum.* See Fig. 408. (B. M. 2565.)

L. l. coriaceum (leathery). *fl.* greenish-white. Summer. *l.* dense, glossy, dark green, leathery, ovate-oblong, obtuse. *h.* 3ft. to 4ft. Japan, 1864. A pretty dwarf-growing evergreen, but not so hardy as the type. See Fig. 409.

L. magnoliæfolium (Magnolia-leaved). A synonym of *L. lucidum.*

L. Massalongianum (Massalongi's).* *fl.* white, numerously disposed in dense, terminal, much-branched panicles, and having a peculiar odour. Summer. *l.* glabrous, linear-lanceolate, mucronate, very shortly stalked. *h.* 6ft. Khasia Hills, 1877. A much-branched evergreen shrub, with ascending warted branches. Garden names of this species are: *L. angustifolium, L. myrtifolium, L. rosmarinifolium,* and *L. spicatum.* (G. C. n. s., xvi. 149.)

L. myrtifolium (Myrtle-leaved). A garden synonym of *L. Massalongianum.*

L. nepalense (Nepaul). A synonym of *L. spicatum.*

L. ovalifolium (oval-leaved).* *fl.* white ; inflorescence thyrsiform. Summer. *l.* oval, oval-elliptic, or obovate, dark green above, lighter beneath, net-veined, shortly stalked. Japan. One of the hardiest and most floriferous of the Privets, more generally cultivated than *L. vulgare* on account of its larger, almost persistent, foliage.

L. o. variegatum (variegated).* Variegation a fine yellow in young leaves, passing into white as leaves get older. A vigorous, compact grower. SYN. *L. californicum robustum variegatum.* There are several other variegated forms of *L. ovalifolium.*

L. Quihoui (Quihou's). *fl.* white, in loose terminal panicles. Summer. *l.* dark green, oblong or oblong-ovate. Branches wiry, purplish, pubescent. China, 1868. (G. C. n. s., xviii. 277.)

L. rosmarinifolium (Rosemary-leaved). A garden synonym of *L. Massalongianum.*

L. Sieboldii (Siebold's). A synonym of *L. japonicum.*

Ligustrum—*continued.*

L. Simonii (Simon's). A synonym of *L. compactum.*

L. sinense (Chinese). *fl.* white, small ; racemes coarctate. Summer. *l.* ovate-lanceolate, shining above and hairy beneath. *h.* 18ft. China, 1874. An evergreen or quasi-evergreen shrub, with slender pubescent branches. SYNS. *L. Ibota villosum* and *L. villosum.*

L. spicatum (spiked). *fl.* white, crowded, almost sessile, spicate, disposed in a thyrse, having the axis very hairy. Summer. *l.* elliptic, acute, hairy beneath, as well as the branchlets. *h.* 6ft. to 8ft. Nepaul, 1823. A hardy, deciduous species. SYN. *L. nepalense.* (B. M. 2921.)

L. spicatum (spicate). A garden synonym of *L. Massalongianum.*

L. strictum (upright). A synonym of *L. lucidum.*

L. syringæflorum (Syringa-flowered). A synonym of *L. japonicum.*

L. villosum (villous). A synonym of *L. sinense.*

FIG. 409. FLOWERING BRANCH OF LIGUSTRUM LUCIDUM CORIACEUM.

L. vulgare (common). Common Privet. *fl.* white at first, but changing to reddish-brown, sweet-scented ; racemes compound, coarctate. Summer. *l.* elliptic-lanceolate, glabrous. *h.* 6ft. to 10ft. Europe (Britain), North Africa. (Sy. En. B. 904.) There are numerous varieties of this most useful shrub, of which the following is an excellent selection :

L. v. buxifolium (Box-leaved). A very distinct variety, differing from the type in its broader and more decidedly evergreen leaves.

L. v. fructu-luteum (yellow-fruited). Somewhat denser in its habit than the type, presenting a very pretty effect in autumn and winter when covered with its bright golden fruit. SYN. *L. v. xanthocarpum.*

L. v. pendulum (pendulous). This variety has long weeping branches, and, when grafted as a standard on a stem 4ft. or 5ft. high, forms an elegant specimen for a small lawn.

L. v. variegatum (variegated). A very pretty form, having the leaves prettily blotched with a bright golden colour.

L. v. xanthocarpum (yellow-fruited). A synonym of *L. v. fructu-luteum.*

LILAC. *See* **Syringa.**

LILIACEÆ. An extensive order of usually herbaceous perennials, very rarely annuals, sometimes frutescent and arborescent, natives of both temperate and tropical regions. Inflorescence mostly terminal, solitary, racemose, spiked, umbellate, or capitate, rarely panicled, furnished with scarious or spathaceous bracts. Leaves

Liliaceæ—*continued.*

polymorphous, cauline, or radical. Root bulbous tuberous, fibrous-fascicled, or with a creeping rhizome. Liliaceæ are remarkable for the beauty of their flowers. The following is a selection of the principal genera cultivated for ornament: *Agapanthus, Fritillaria, Funkia, Hemerocallis, Hyacinthus, Lilium, Methonica, Scilla, Tulipa, Urginea*, &c. *Urginea* furnishes a large bulb, which is used medicinally under the name of Squill. Certain species of *Aloe* yield an extremely bitter resinous juice, much employed in medicine. The genus *Allium* supplies the Onion, Leek, Chive, Shallot, Rocambole, and Garlic. The order comprises upwards of 180 genera, and about 2500 species.

LILIUM (the old Latin name, akin to Greek *Leinon*, a Lily). Lily. Ord. *Liliaceæ*. This well-known genus comprises about forty-five species of hardy, half-hardy, or greenhouse bulbs, natives of the temperate regions of the Northern hemisphere. Flowers large, showy, either solitary at the tops of the stems, or many (or few) in a loose raceme; perianth deciduous, funnel-shaped or sub-campanulate; segments free, variable in shape, erect, spreading or reflexed; stamens six, hypogynous; racemes rarely sub-ramose, often spreading or pendulous, rarely erect. Leaves very variable, from rotundate-cordate to lanceolate or linear, sometimes arranged in regular whorls, sometimes having bulblets in the axils. Stems erect, leafy, simple, or rarely branched at apex. Bulbs various, mostly presenting the usual type of fleshy, imbricated, lanceolate scales, but rarely thick, wrapped in large membranous tunics.

The species are amongst the most beautiful and ornamental of cultivated bulbous plants, their stately habit and variously-coloured flowers (which are, in many cases, highly perfumed) rendering them indispensable subjects for greenhouse decoration, and for outside flower-garden embellishment. Nearly all the species and varieties may be termed hardy in most localities, if provided with a well-drained soil. As a precaution against injury to the bulbs from frost, it is well to cover them all the winter with a mound of ashes or cocoa-nut fibre, removing it again in spring. Valuable or scarce sorts should not be trusted outside permanently, unless their hardiness has been previously proved. The commoner and more plentiful species may be effectively employed for grouping or naturalising. Many of them are excellent border plants when in flower, being extremely attractive in mixed arrangements, if properly placed in respect of height. Many of the strong-growing Lilies are well adapted for planting amongst shrubs, where the latter are not too thickly placed. By growing a selection of species in pots, to flower at different times, a valuable addition to greenhouse decorative subjects is secured over a long period, in summer and autumn. Liliums are annually imported, in immense quantities, from Japan, particularly *L. auratum*. This is one of the best for pot culture, and one which succeeds well, planted outside, in peat beds, where the primary occupants, such as Azaleas, Rhododendrons, &c., preserve the bulbs from injury by frost in winter, and the tender flower-stems from cold and rough winds in spring. Evergreen shrubs such as those named, amongst several others, are surface-rooting, and their foliage shades the soil beneath from hot sun, and keeps it cool, in summer, these conditions being also most favourable to Lily culture. *L. bulbiferum, L. giganteum, L. longiflorum*, and *L. speciosum*, with each of the varieties of the last-named, are well adapted for culture, in pots, along with *L. auratum*.

Propagation. Liliums may be increased by seeds, by offsets, and sometimes by small bulblets which form in the axils of the leaves; the bulb scales, too, may be turned to account in propagating rare or distinct varieties. Seeds should be sown, when ripe, in well-drained pans

Lilium—*continued.*

of sandy peat, then slightly covered with similar soil and a layer of moss, and placed in a cool frame. They do not vegetate, as a rule, for several months; and, as it takes from four to six years to grow from seed bulbs large enough to produce flowers, the process is a slow one. The usual method of increase is by offsets, which are produced, in many instances, in great abundance round the old bulb, or amongst its scales. More than one flower-stem is often produced, and this has a tendency to cause the formation of a bulb for each, which may be detached for propagating purposes. Offsets vary in size, according to the species; they should be planted a few inches apart, in a prepared bed, and encouraged to grow quickly into flowering sizes. *L. bulbiferum* and *L. tigrinum* bear, in the axils of the leaves, quantities of

Fig. 410. Young Bulblets of Lilium.

bulblets, illustrations of which are shown in Fig. 410. They may be easily collected in summer, and, if planted like offsets, will soon grow, and eventually form flowering bulbs.

Cultivation. Where soils are light and naturally well drained, the few special requirements of different Lilies may be readily met by the addition of fresh soil at planting time—heavier or lighter, as the case may be. Nearly all the species prefer peat, and, where plenty of this is obtainable, some may, with advantage, be used, along with loam and leaf mould, or some other light manure. *L. candidum* prefers rather heavy loam, which should be of a good depth. It succeeds best on such soil when left alone for years in succession without being disturbed at the root. The beautiful pure white flowers of this common species are very attractive, early in summer. *L. tigrinum*, and its varieties, succeed in almost any position, as they are extremely hardy; the quality and size of their flowers are, however, very much superior when the soil is made rich, and plenty of water is given in summer. *L. Humboldtii, L. Martagon,*

Fig. 411. Bulb of Lilium.

L. monadelphum, and *L. Washingtonianum*, amongst others, prefer moderately heavy loamy soil; *L. Catesbœi, L. Leichtlinii, L. pardalinum, L. philadelphicum*, and *L. tenuifolium*, may be recommended for planting in peaty soil in moist situations. Liliums prefer a partial shade,

Lilium—*continued.*

but not a position overhung with trees. Protection from high winds is also an important point with plants growing to such a height as these. Early autumn, after the stems have ripened off, is the best time for lifting or replanting. Lily bulbs should not be allowed to lie out of the ground, or be exposed to the weather, longer than can possibly be helped. They are, as described above, mostly composed of a number of fleshy scales (see Fig. 411), which contract and become withered under the drying influence of the open air. This alone is a sufficient explanation of the numerous failures with purchased bulbs—the length of time they may have been stored in the seedsmen's shops. From 4in. to 6in. is a suitable depth for planting. A number of roots proceed from the stem above the bulb each year, and a less depth than this would not allow of their being covered with soil. A mulching of rotten manure, and plenty of water, are of great assistance in developing the flowers, if applied as soon as they are sufficiently advanced to be seen. The flower shoots should not be cut off before they have thoroughly ripened.

Cultivation in Pots. As previously remarked, a few of the Liliums are indispensable conservatory plants, and must, consequently, be amenable to culture in pots. Loam and peat, in about equal parts, with some charcoal or sharp sand added, will be a suitable compost. Potting should be performed when the bulbs are at rest in autumn. Those which are imported are largely cultivated in this way, but they seldom have the strength and solidity of those which are home grown; the latter are, however, much more expensive. A very large proportion of the imported bulbs of *L. auratum* never live to flower. Unfortunately, they have the appearance of being sound, and of good quality, on arrival; but the possibility of their being collected and packed in an immature state, and the injurious effect consequent on travelling, have each their evil results in causing the bulbs to rot when they are placed in soil. It is best to defer purchasing until towards spring, as then there is a likelihood of the bulbs being at least better ripened, and in a more suitable condition for starting quickly. They should be placed singly in well-drained pots, half filled with light soil, and be only partially covered. The cause of evil, to be frequently looked for and removed, is the presence of a fungus amongst the scales, which causes them, and also the base, to get rotten. A little dry, pounded charcoal should be shaken amongst the scales, and placed beneath each bulb, when potting. Only a slight syringing occasionally will be required until growth commences—a time which will be indicated by the appearance of roots, and the formation of a shoot in the centre. The pots may then be filled up, or the bulbs transferred to larger ones, if those in which they are already placed are less than 6in. in diameter. In either case, deep potting should be the aim, as it is very important that the upper roots should be in contact with good soil. As the flowering stage arrives, liquid manure may be given with advantage, but it should not be applied previous to this. Any imported Liliums should be treated at first as above described; those which are home grown do not usually require such precautions to induce them to start. After flowering is over, the plants should be placed in the open air, water being gradually withheld as they begin to ripen. Those intended for late summer flowering may be grown in a shady position outside, after the middle of May. Repotting for the succeeding year should be practised in the autumn, and the pots, with their contents, stored, during winter, in a cool, but not over-dry, place.

Mr. Baker's admirable analysis of the present genus, by the help of which the correct name of any species in cultivation may be determined, is given below:

Lilium—*continued.*

SUB-GENUS I. *Cardiocrinum.*

- Perianth funnel-shaped, with oblanceolate segments, falcate only at the apex. Leaves stalked, cordate-ovate . . . . . — *L. cordifolium.* *L. giganteum.*

SUB-GENUS II. *Eulirion.*

Perianth funnel-shaped, with oblanceolate segments, which are falcate only at the apex. Leaves linear or lanceolate, sessile or nearly so.

- Tube scarcely widened from the base to the middle . . . . . — *L. longiflorum.* *L. neilgherrense.* *L. philippense.* *L. Wallichianum.*
- Tube gradually narrowing from the base to the neck. Leaves scattered . . — *L. candidum.* *L. japonicum.* *L. Krameri.* *L. nepalense.*
- Leaves in whorls . . . . . — *L. Parryi.* *L. Washingtonianum.*

SUB-GENUS III. *Archelirion.*

Perianth open, funnel-shaped, with deeply-spreading segments, which are broadest below the middle; stamens diverging from the curved style.

- Leaves sessile . . . . . — *L. oxypetalum.* *L. tigrinum.*
- Leaves shortly stalked . . . . — *L. auratum.* *L. speciosum.*

SUB-GENUS IV. *Isolirion.*

Perianth erect, with segments which are falcate in the extended flower, but not revolute; stamens diverging on all sides from the straight style.

- Leaves in whorls . . . . . — *L. medeoloides.* *L. philadelphicum*
- Leaves scattered. Style shorter than ovary . . . . . — *L. concolor.*
- Style longer than the ovary . . — *L. bulbiferum.* *L. Catesbæi.* *L. croceum.* *L. davuricum.* *L. elegans.*

SUB-GENUS V. *Martagon.*

Perianth cernuous, with the segments very revolute; stamens diverging on all sides from the curved style.

Leaves in whorls.

- American species. Bulbs annual, bearing rhizomes . . . . . — *L. canadense.* *L. nitidum.* *L. pardalinum.* *L. Rœzlei.* *L. superbum.*
- Bulbs perennial, hardly rhizomiferous . . . . . — *L. columbianum.* *L. Humboldtii.*
- Old World species . . . . — *L. avenaceum.* *L. Hansoni.* *L. Martagon.*

Leaves scattered.

- Leaves lanceolate, many-nerved. Perianth falcate above the middle — *L. monadelphum.*
- Perianth revolute to below the middle . . . . . — *L. carniolicum.* *L. polyphyllum.*
- Leaves narrowly linear, with one or few nerves. Segments of the perianth from six to twelve lines broad in the middle . . . . . — *L. Leichtlinii.* *L. pseudo-tigrinum.* *L. testaceum.*
- Segments of the perianth from three to six lines broad in the middle . . . . . — *L. callosum.* *L. chalcedonicum.* *L. pomponium.* *L. tenuifolium.*

SUB-GENUS VI. *Notholirion.*

- Stigma trifid (in all the representatives of the other sub-genera, the stigma is only faintly three-lobed) . . . . . — *L. Hookeri.* *L. roseum.*

L. alternans (alternating). A garden synonym of *L. elegans brevifolium.*

L. aurantiacum (orange-red). A synonym of *L. elegans.*

L. aurantiacum (orange-red), of gardens. A synonym of *L. elegans bicolor.*

L. auratum (golden).* Golden-rayed Lily of Japan. *fl.* ivory-white, with a distinct central band of bright yellow and numerous deep purple spots, the lower part copiously papillose, from 10in. to 12in. across when expanded; raceme deltoid, often twenty-flowered; peduncles rigidly erecto-patent. Summer. *l.* about thirty at the flowering time, spreading or deflexed, linear-lanceolate; the lower ones 6in. to 9in. long, nine to fifteen lines broad below the middle, acuminate. Stem 2ft. to 4ft. high, rigid, erect, purplish-green, terete. Japan, 1862. A really splendid plant, of which a large number of varieties are in cultivation. See Fig. 412. (B. M. 5338; F. d. S. 1528-31; I. H. ix. 338; R. H. 1867, 371.)

Lilium—*continued.*

L. autumnale (autumnal). A synonym of *L. superbum carolinianum.*

L. avenaceum (Oat-like). *fl.* few, sometimes sub-umbellate, on pedicels 2in. to 3in. long; perianth fine reddish-yellow, slightly scented, 1¼in. to 1½in. long; segments lanceolate, about ½in. broad, cucullate at apex, minutely dotted. *l.* horizontal, oblanceolate, 3in. to 4in. long, ½in. to 1¼in. broad, glabrous, tender, sometimes partly whorled. Stem glabrous, terete, 1½ft. to 2ft. high. Japan, &c., 1865. (R. G. 485.)

L. Bloomerianum (Bloomer's). A synonym of *L. Humboldtii.*

L. Brownii (Brown's). A synonym of *L. japonicum Brownii.*

L. bulbiferum (bulb-bearing).* *fl.* red, slightly cottony on the outside, 2in. to 2½in. long, permanently erect; raceme sometimes congested into an umbel, twelve to eighteen-flowered. Summer. *l.* irregularly scattered, fifty to sixty to a stem at the flowering time, linear, erecto-patent, sessile, the upper ones bearing clustered or solitary, stalked or sessile, chestnut-brown bulblets in their axils. Stem 2ft. to 4ft. high, rigid, erect, sulcate, pubescent. Bulb ovoid, the outer scales 1in. deep. Europe, 1820. A very desirable garden plant. See Fig. 413. (B. M. 1018; J. F. A. 226.)

L. bulbiferum (bulb-bearing), of De Candolle. A synonym of *L. croceum.*

L. callosum (callous-bracted). *fl.* bright scarlet, drooping, 1½in. to 1¾in. deep, about a dozen in a narrow, regular, thyrsoid raceme; peduncles 1in. to 1½in. long, subtended by a pair of small bracts, which are curiously indurated, and hood-shaped at the tip. Summer. *l.* ascending, about thirty to a stem at the flowering time; lower ones 4in. to 5in. long, scarcely over ½in. broad at the middle, having a long acute point; edge slightly recurved. Stem 2ft. to 3ft. high, moderately slender, sub-terete. Japan, 1840. (S. Z. F. J. ix. 41.)

FIG. 412. INFLORESCENCE OF LILIUM AURATUM.

L. canadense (Canadian).* *fl.* varying in colour from bright yellow to pale bright red, with copious spots, especially in the lower two-thirds, of purplish-red corymbose, pendulous; perianth 2in. to 2½in. long, the divisions much less reflexed than those of *L. Martagon.* Summer. *l.* typically in four or five regular whorls, 2in. to 3in. apart, of six to fifteen oblanceolate leaves, spreading nearly horizontally, narrowed gradually to an acute point. Stem 1½ft. to 3ft. high, erect, terete. Bulb more or less obliquely rhizomatous. North America, 1829. SYN. *L. penduliflorum.* See Fig. 414. (B. M. 800, 858; F. d. S. 1174.)

L. c. parvum (small). *fl.* loosely corymbose, drooping, on very slender pedicels 3in. to 4in. long; perianth bright orange-red, 1in. to 1¼in. long, the tube greenish externally, the segments oblanceolate, spotted with dark red-purple about the throat. June. *l.* scattered or whorled, or both, on the same stem, lanceolate or oblong-lanceolate, 1½in. to 2in. long. Stem slender, 1½ft. to 2ft. high. California. (B. M. 6146; R. G. 725.)

L. candidum (white).* St. Joseph's Lily. *fl.* pure pearl-white, very rarely tinged with purple on the outside, 2in. to 3in. long, the upper ones more or less ascending, the lower drooping; racemes from five to ten or even twenty-flowered, thyrsoid.

Lilium—*continued.*

FIG. 413. FLOWER-STEM OF LILIUM BULBIFERUM.

June. *l.* six to two hundred, much crowded in the lower half, erecto-patent, linear, the lowest reaching 6in. to 8in. long, ½in. to 1in. broad above the middle. Stem 2ft. to 3ft. high, stiff, erect, six to nine lines thick at the base. South Europe, 1596. A very handsome and common species. See Fig. 415. (B. M. 278.)

FIG. 414. LILIUM CANADENSE, showing Habit and detached Single Flower.

Lilium—*continued.*

L. c. peregrinum (foreign). *fl.* rather smaller than those of the type; divisions a little narrower. *l.* also narrower and fewer. The whole plant more slender in habit. SYN. *L. peregrinum* (under which name it is figured in S. B. F. G. ser. ii. 367).

L. c. spicatum (spicate). A garden form, with petaloid white bracts.

FIG. 415. FLOWER-STEM OF LILIUM CANDIDUM.

L. c. striatum (striated). *fl.* having the segments striped with purple externally. (F. d. S. 735.)

L. carniolicum (Carniolian). *fl.* bright orange-yellow, passing sometimes into scarlet, 1½in. to 2in. long; peduncles 2in. to 3in. long. June and July. *l.* thirty to forty, always scattered, much-ascending, linear-lanceolate, acute, the edge minutely ciliated. Stem 2ft. to 3ft. high, stout, erect. Bulb ovoid, with lanceolate scales 1in. deep. South Europe, &c.

L. carolinianum (Carolina). A synonym of *L. superbum carolinianum.*

L. Catesbæi (Catesby's).* *fl.* bright orange-red, copiously spotted with purple, solitary, 3in. to 4in. long. Summer. *l.* never whorled, twenty to thirty, ascending, sessile; lower ones lanceolate, acute; the upper ones growing gradually smaller and narrower, and ceasing from 1in. to 2in. below the flower. Stem 1ft. to 2ft. high, slender, erect, straight. North America. (B. M. 259; L. B. C. 807; S. B. F. G. ser. ii. 185.)

L. chalcedonicum (Chalcedonian).* *fl.* bright scarlet, rarely yellowish, from one to six, sub-corymbose, pendulous; peduncles 2in. to 4in. long. Summer. *l.*, at the flowering time, fifty to eighty, lower ones sub-patent, upper ones ascending, all scattered, linear. Stem stiff, erect, 2ft. to 3ft. high, striated. Greece, 1796. See Fig. 416. (B. M. 30; F. d. S. 2160.) An old and well-known garden favourite. There is a very desirable form, *majus*; and another, *græcum*, having smaller flowers, but a taller habit than the type.

L. colchicum (Colchican). A synonym of *L. monadelphum Szovitsianum.*

L. columbianum (British Columbian). *fl.* two or three, umbellate, on slender pedicels 2in. to 4in. long; perianth of a splendid reddish-orange, 1½in. to 2in. long, the lanceolate segments dotted with purple and reflexed. *l.* few; lower ones disposed in four or five-leaved whorls; upper ones sparse, oblanceolate, acute, 1½in. to 2in. long, about ½in. broad. Stem 1½ft. to 2ft. high, slender, glabrous. Oregon, British Columbia, 1872.

L. concolor (one-coloured). *fl.* bright scarlet, 1½in. to 2in. long, disposed in corymbs of five or six; peduncles erecto-patent. Summer. *l.* twenty to thirty at the flowering time, scattered irregularly, spreading, lanceolate, the lower ones 3in. to 4in. long, narrowed to both ends. Stem 1ft. to 3ft. high, erect, sub-terete, obscurely pubescent. Bulb ovoid, about 1in. deep. China, 1806. (B. M. 1165.) SYN. *L. sinicum* (F. d. S. 1206; I. H. 100).

L. c. Buschianum (Busch's).* *fl.* splendid scarlet, lower portion of segments bearing numerous small black spots. *l.* narrow, deep green. Southern Siberia. (L. B. C. 1628; B. M. 6005, under name of *L. c. sinicum.*)

L. c. Coridion (Coridion). *fl.* bright yellow, scattered over, principally on the lower half of the face, with distinct reddish-brown spots, solitary. Japan. (R. G. 885.)

L. c. Partheneion (Partheneion). *fl.* bright red-yellow, faintly spotted on the face, solitary. Japan.

FIG. 416. FLOWER-STEM OF LILIUM CHALCEDONICUM.

L. c. pulchellum (pretty). *fl.* bright scarlet, with a few faint spots of black, erect, twelve to fourteen lines long, solitary in the wild plants, but produced in half-dozens under cultivation. *l.* twenty to thirty at the flowering time, scattered irregularly, narrow-linear, ascending. Stems slender, 6in. to 12in. high, slightly sulcate. Bulb ovoid, about the size of a hazel-nut; the scales few, fleshy, ovate, snow-white. Mongolia, &c., 1834. A very pretty little variety, rarely seen in cultivation. SYN. *L. pulchellum.* See Fig. 417. (R. G. 1860, 284, Fig. 2.)

L. c. sinicum (Chinese). A synonym of *L. c. Buschianum.*

L. cordifolium (heart-shape-leaved).* *fl.* white, yellow, purple; perianth narrow, funnel-shaped; racemes four to ten-flowered; pedicels floriferous, spreading; anthers yellow. August. *l.*, primordial ones tinged with blood-colour; stem ones deeply cordate, on long petioles. Stem 3ft. to 4ft. high. Japan, 1853. SYN. *Hemerocallis cordata.*

Lilium—*continued.*

FIG. 417. LILIUM CONCOLOR PULCHELLUM, showing (1) Inflorescence, (2) Ovary and Anther, and (3) Portion of Stem, with Leaf.

L. coruscans (glittering). A garden synonym of *L. elegans atrosanguineum.*

FIG. 418. LILIUM DAVURICUM, showing Habit and detached Inflorescence.

L. croceum (yellow).* *fl.* disposed in deltoid or umbellate racemes; perianth erect, broadly funnel-shaped; segments beautiful golden, slightly scarlet-tinted. July. *l.* scattered, clustered, spreading, or at length lightly squarrose, linear; inferior ones sessile, glabrous, firm. Stem 3ft. to 6ft. high, purple-spotted, more or less cobwebby. South Europe. SYN. *L. bulbiferum* (of De Candolle) (under which name it is figured in B. M. 36).

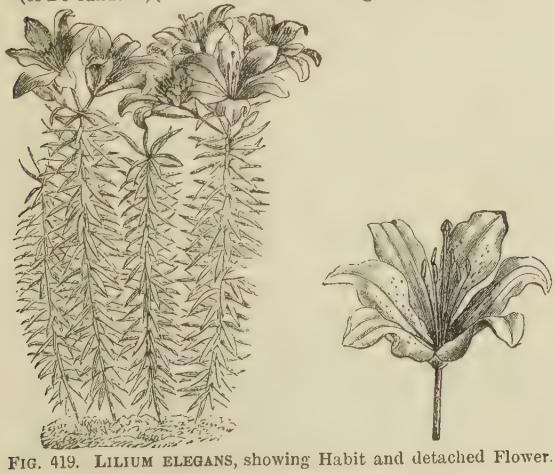


FIG. 419. LILIUM ELEGANS, showing Habit and detached Flower.

Lilium—*continued.*

L. davuricum (Dahurian).* *fl.* umbellate or shortly racemose; perianth beautiful scarlet; pedicels naked or lightly cobwebby. July. *l.* sessile, linear, trinerved. Stem 2ft. to 3ft. high, slender, green. Siberia, 1745. SYNS. *L. pennsylvanicum* (B. M. 872), *L. spectabile* (R. G. 349). See Fig. 418. (B. M. 1210; R. G. 740.)

L. elegans (elegant).* *fl.* pale scarlet-red, scarcely at all spotted, from 5in. to 6in. across when expanded. July. *l.* broader than in the other forms, lanceolate, sometimes 1in. wide, without bulblets in their axils. Stem one or two-headed. Japan, 1835. SYNS. *L. aurantiacum* (P. M. B. vii. 127), *L. lancifolium*, *L. Thunbergianum* (B. R. 1839, 38). See Fig. 419.

L. e. alutaceum (ornamentally-dotted). *fl.* solitary; perianth pale apricot colour; interior of segments copiously dotted with purple. Stem dwarf. SYN. *L. Thunbergianum aureum nigro-maculatum* (under which name it is figured in F. d. S. 1627).

L. e. armeniacum (apricot-colour).* *fl.* golden-spotted, one or two. *l.* thirty to forty; inferior ones linear. Stem under 1ft. high.

L. e. atrosanguineum (dark red).* *fl.* very often solitary; segments broad, blotched with red. SYN. *L. coruscans*, of gardens.

FIG. 420. LILIUM GIGANTEUM.

Lilium—*continued.*

L. e. bicolor (two-coloured). *fl.* orange-red, with purplish-black spots. 1870. SYN. *L. aurantiacum*, of gardens.

L. e. brevifolium (short-leaved). *fl.*, perianth pale red, black-spotted. July. *l.* shorter and broader than in the type. Japan. SYN. *L. alternans*, of gardens.

L. e. citrinum (orange-coloured). This scarcely differs from *L. e. armeniacum*. (F. d. S. 2319.)

L. e. fulgens (bright). A variety having flowers blotched with red. (I. H. 657.) *Batemanni* is a splendid form of this.

L. e. pardinum (leopard-spotted). This variety scarcely differs from *L. e. bicolor*, but the stem is taller, and the flowers are umbellate.

L. e. sanguineum (blood-coloured).* *fl.*, segments blood-red, mixed with golden. *l.* lanceolate. Stem 1ft. to 1½ft. high. (B. R. 1846, 50.)

Other varieties are: *hæmatochroum* (I. H. 503), with deep claret-red flowers, and *venustum* (B. R. xxxii. 50), both with narrower leaves and more campanulate flowers.

L. excelsum (tall). A synonym of *L. testaceum*.

L. eximium (choice). A synonym of *L. longiflorum eximium*.

FIG. 421. LILIUM HANSONI, showing Habit and detached Flower.

L. giganteum (giant).* *fl.* white, slightly tinged with green on the outside, and with purple in the throat, funnel-shaped, 5in. to 6in. long, measuring about 1in. round at the base, saccate, especially on the lower side, and 5in. to 6in. round the neck when fully expanded, the segments spreading only at the very tip; raceme from six to twelve-flowered, and from 12in. to 20in. long. Summer. *l.* all, except the uppermost, distinctly stalked; the lower ones 6in. apart, with broad channelled petioles 1ft. or more long, clasping the stem broadly at the base; the blade broad cordate-ovate, reaching 1ft. or even 1½ft. in length; upper leaves growing gradually smaller and closer till those beneath the raceme are not more than 3in. to 4in. long. Stem straight, erect, terete, 4ft. to 10ft. high, 1in. to 2in. in diameter in the lower part. Bulb as large as an apple, of fleshy, ovate, sub-patulous scales.

Lilium—*continued.*

Himalayas, 1852. A splendid species, hardy only in favoured spots in the South of England, &c. See Fig. 420. (B. M. 4673.)

FIG. 422. FLOWERS OF LILIUM LONGIFLORUM.

L. Hansoni (Hanson's).* *fl.* four to ten, disposed in a loose raceme, or in a crowded umbel, on erecto-patent pedicels, 1½in. to 2in. long; perianth fine reddish-orange, 1½in. to 1¾in. long, with thick, lanceolate, profoundly falcate-revolute, purple-dotted segments. *l.* oblanceolate, acute, tender, glabrous, often eight to twelve in one whorl at the middle of the stem, 4in. to 5in. long, ⅔in. to 1in. broad. Stem 3ft. to 4ft. high, slender, glabrous, terete. Japan, 1865. See Fig. 421.

L. Harrisii (Harris's). A synonym of *L. longiflorum eximium*.

L. Hookeri (Hooker's). This is the correct name of the plant described in this work as *Fritillaria Hookeri*.

L. Humboldtii (Humboldt's). *fl.* often six to ten, sometimes thirty or forty, disposed in a broad deltoid panicle; perianth of a splendid reddish-orange colour, greenish outside at base; segments copiously purple-veined, acute, closely reflexed. *l.* usually regularly verticillate, in ten to fifteen-foliate whorls, oblanceolate; lower ones 4in. to 5in. long, nearly 1in. broad. Stem terete, robust, 4ft. to 5ft. high, glabrous or puberulous, reddish-spotted. Bulb 2in. to 4in. thick. California, &c., 1872. SYN. *L. Bloomerianum*. (F. d. S. 1973-4; R. G. 724.) The variety *ocellatum* has a yellow perianth, conspicuously dotted with purple.

L. isabellinum (Isabel-coloured). A synonym of *L. testaceum*.

L. japonicum (Japanese).* *fl.* pure white within, but more or less tinged with purple on the outside, 5in. to 6in. long, more or less ascending, usually solitary in the wild plant, and not more than in twos or threes in the cultivated one; perianth broader round the neck than in *L. longiflorum*. Summer. *l.* twelve to twenty, scattered, more spreading than those of *L. longiflorum*, oblanceolate, the lower ones reaching 4in. to 6in. long, not distinctly petiolate. Stem 1ft. to 2ft. high, erect, stiff, terete. Japan, 1804. A very handsome but somewhat delicate species. (B. M. 1591; L. B. C. 438.) SYN. *L. odorum* (F. d. S. 876-7).

L. j. Brownii (Brown's). *fl.* sometimes three or four, 7in. to 8in. long, more drooping than those of the type, tinged with purple on the outside. Stem 3ft. to 4ft. high, marked with dark purple spots and streaks. (F. d. S. 47, 2248, under name of *L. Brownii*.)

L. Krameri (Kramer's).* *fl.* white, slightly reddish, sweet-scented; perianth horizontal, solitary, broadly funnel-shaped, 6in. to 7in. long, with oblanceolate-oblong segments. July. *l.* distant, sparse, linear-lanceolate, acuminate, very shortly petiolate, firm, 6in. to 9in. long, ½in. to ⅔in. broad. Stem 3in. to 4in. high, slender terete, glabrous, purple-spotted. Japan. (B. M. 6058.)

L. lancifolium (lance-shape-leaved). A synonym of *L. elegans*.

L. Leichtlinii (Leichtlin's).* *fl.* one or two, bright yellow, spotted copiously down the face with large purplish-red dots, tinged with purple outside, inside spotted with vinous-red, 2½in. to 3in. long; pedicels erecto-patent. July and August. *l.* all scattered, somewhat loose, erecto-patent; lower ones 3in. to 4in. long, ⅓in. to ½in. broad below the middle, with a long acute point. Stem 2ft. to 3ft. high, moderately slender. Japan, 1867. (B. H. 1869, 11; B. M. 5673; F. d. S. 1736; F. M. 509; I. H. 540.)

L. L. majus (large). This is a luxuriant form, attaining a height of 5ft. The flowers are yellow, purple-black spotted. Japan, 1872.

Lilium—*continued.*

L. L. Maximowiczii (Maximowicz's). *fl.* three or four, the groundwork of colour bright scarlet. Stem dark purplish-brown, more distinctly cottony than in the type. SYN. *L. Maximowiczii* (R. G. 1868, 596).

L. L. platypetalum (broad-petaled). *fl.* bright pale red; perianth segments broader than in the type.

L. L. tigrinum (tiger-spotted). *fl.* orange-scarlet, thickly dotted with dark purple. *l.* erecto-patent, recurved at apex. (R. G. 664, under name of *L. Maximowiczii tigrinum.*)

L. linifolium (Flax-leaved). A synonym of *L. tenuifolium.*

L. Loddigesianum (Loddiges'). A synonym of *L. monadelphum.*

L. longiflorum (long-flowered).* *fl.* pure white, fragrant, 5in. to 7in. long, shaped like a funnel with a neck, solitary or in twos, horizontal or slightly drooping. June. *l.* twenty to thirty at the flowering time; the lower ones crowded, erecto-patent, 3in. to 5in. long, linear, three to six lines broad about the middle, acute. Stem 1ft. to 2ft. high, stiff, terete, erect. Japan, China, &c., 1062. A very handsome species. See Fig. 422. (B. R. 560; F. d. S. 270; L. B. C. 985.)

L. l. eximium (choice).* *fl.* white, large, infundibuliform-campanulate; limb segments revolute, firm, undulated, outer ones narrow and acutely callous at apex; inner ones narrower and obtusely rotundate at apex. *l.* few, clustered, narrow-lanceolate. Japan. SYN. *L. Harrisii.* (F. d. S. 283, 284, under name of *L. eximium.*)

FIG. 423. FLOWER-STEM AND DETACHED FLOWER OF LILIUM MARTAGON.

L. Martagon.* Martagon, or Turk's Cap Lily. *fl.* of a dull purplish-red, with copious spots of dark purple, pendulous, 1¼in. to 1½in. deep; raceme more regularly pyramidal than that of any other species, reaching, in fine specimens, 1ft. in length, and sometimes nearly twenty-flowered. Summer. *l.* typically in three or four regular whorls of six to nine leaves each, with a few scattered ones placed usually between the uppermost and the inflorescence, oblanceolate-spathulate, acute. Stem 2ft. to 3ft. high, erect, terete, more or less pubescent. Bulb ovoid, 1in. to 1¼in. thick; scales bright yellow. Europe, Asia, 1596. A very distinct and largely-grown species. See Fig. 423. (B. M. 893, 1634; J. F. A. 351; Sy. En. B. 1518.)

L. Maximowiczii (Maximowicz's). A synonym of *L. Leichtlinii Maximowiczii.*

L. M. tigrinum (tiger-spotted). A synonym of *L. Leichtlinii tigrinum.*

L. medeoloides (Medeola-like). *fl.* splendid orange-red, with a few purple spots, about 1½in. long, solitary, or in umbels of two or three. *l.* either in a single whorl of seven to fourteen at the middle of the stem, or a few scattered, oblanceolate, similar to those of *L. Martagon*, 4in. to 6in. long. Stem 1ft. to 2ft. high, slender, terete, flexuose. Japan, 1878. A very distinct species, but probably not yet in cultivation.

L. Michauxianum (Michaux's). A synonym of *L. superbum carolinianum.*

L. monadelphum (monadelphous).* *fl.* pale bright yellow, tinged round the base with claret-red, 2½in. to 3½in. long, disposed in terminal pyramidal clusters. Autumn. *l.* always scattered, thirty to fifty to a stem, much-ascending, linear-lanceolate, acute, distinctly ciliated at the edge. Stem stout, erect, 3ft. to 5ft. high. Caucasus and Northern Persia, 1820. (B. M. 1405; R. G. 733.) SYN. *L. Loddigesianum* (P. F. G. 58).

L. m. Szovitsianum (Szovits').* This differs from the type in having the "filaments free to the base, perianth reflexed from rather lower down, with segments broadest a little below the middle." The pollen is said to be deeper in colour. SYNS. *L. colchicum, L. Szovitsianum* (F. d. S. 507-9).

L. neilgherrense (Neilgherries).* *fl.* white, sweet-scented, one to three, ascendent; perianth narrow, funnel-shaped; segments oblanceolate-unguiculate. *l.* glabrous, shining-green, ascendent, firm, three to five-nerved. Stem 2ft. to 3ft. high, upright. Neilgherries. Greenhouse. SYNS. *L. tubiflorum, L. Wallichianum.* (B. M. 6332.)

L. nepalense (Nepaulese). *fl.* white, more or less suffused with purple on the outside towards the base, from 4in. to 5in. long, solitary, umbellate, or laxly racemose, about six-flowered, narrow, thyrsoid. *l.* thirty to fifty, scattered, linear-lanceolate; the lower ones 3in. to 4in. long, six to nine lines broad in the middle, acute, erecto-patent. Stem 1½ft. to 3ft. high, erect, ½in. thick at the base. Central Himalayas, &c., 1855. Greenhouse.

L. nitidum (bright). *fl.* bright yellow, 1½in. long; panicle deltoid, 6in. to 12in. long, from ten to twenty-flowered; lower pedicels 2in. to 3in. long. *l.* up to twenty in a whorl, lanceolate, 1½in. to 2in. long. Stem 1½ft. long below the inflorescence, stout, terete. Bulb transversely oblong, with crowded, adpressed, lanceolate, white scales. California, 1880.

L. odorum (odorous). A synonym of *L. japonicum.*

L. oxypetalum (sharp-petaled).* *fl.* solitary, terminal, somewhat drooping, at first campanulate, at length spreading; sepals lilac-purple, with a green keel externally, the lower half within purple-dotted, ovate or ovate-oblong, acute, clawed at base. June. *l.*, radical ones usually solitary, long, lanceolate, tapering to a petiole-like base; cauline ones distant, linear or linear-lanceolate, at length recurved. Stem 1ft. to 1½ft. high. Pindari, Kumaon. (B. M. 4731, under name of *Fritillaria oxypetala.*)

L. pardalinum (leopard-spotted).* *fl.* bright orange-red, with a lighter orange centre and large purple spots on the lower half, nodding, racemose, or the lower in whorls or long spreading pedicels. Summer. *l.* usually in three or four whorls of nine to fifteen, scattered above and below, narrowly lanceolate and sharply acuminate, 3in. to 7in. long, and three to twelve lines broad. Stems 3ft. to 7ft. long. California, 1875. A very handsome North American Lily, of which the following are the most distinct varieties: *Bourgæi*, one of the finest, producing stout stems, 6ft. to 7ft. in height, bearing from twelve to twenty flowers of a bright crimson, shading to orange, and freely spotted with maroon; *californicum*, a variety of more slender habit, growing from 3ft. to 4ft. in height, the brightest coloured of the forms here mentioned; *pallidifolium*, a dwarf variety, scarcely reaching 5ft. in height, flowers nearly double the size of the type, and paler in colour; *Robinsoni*, a robust variety, having stout stems, 7ft. to 8ft. in height, and massive, the flowers large, of a bright vermilion, shading to yellow, and freely spotted.

L. Parryi (Parry's).* *fl.* pale yellow, copiously spotted with chocolate-red, fragrant, horizontal. Summer. *l.* usually scattered, occasionally the lower ones in a whorl, linear-lanceolate, 4in. to 6in. long, acuminate. Stem slender, 2ft. to 6ft. high. California, 1879. A distinct and handsome species.

L. penduliflorum (pendulous-flowered). A synonym of *L. canadense.*

L. pennsylvanicum (Pennsylvanian). A synonym of *L. davuricum.*

L. peregrinum (foreign). A synonym of *L. candidum peregrinum.*

L. philadelphicum (Philadelphian).* *fl.* bright orange-red usually spotted with purple in the lower half, 2in. to 3in. deep, under 2in. across at the mouth when expanded, solitary or umbellate; peduncles ascending, arcuate, or straight. Summer. *l.* typically in four or five regular whorls of six to eight each, 2in. to 4in. apart, spreading, narrowly oblanceolate, narrowed at both

Lilium—*continued.*

ends. Stem 1ft. to 3ft. high, rigid, slender. Bulb ovoid, 1in. thick. North America, 1754. (B. M. 519; B. R. 594; L. B. C. 976.)

L. p. andinum (Andes). This variety differs principally from the type in having all its leaves linear and scattered.

L. philippense (Philippines). *fl.* horizontal, solitary; perianth white, slightly tinged with green at the base externally, narrow funnel-shaped, 7in. to 10in. long, sweet-scented, the divisions remaining permanently imbricated in the lower three-quarters, spreading falcately in the upper quarter, the three inner about 2in., and the three outer 1½in., broad; stamens a little exserted. August. *l.* thirty to forty, loosely scattered down the stem, narrow-linear, sessile, falcate-ascending, 3in. to 4in. long, ⅛in.

FIG. 424. LILIUM POMPONIUM, showing Habit and detached Flower.

to ¼in. broad, acute, glabrous, with narrowly-decurved edges not at all ciliated. Stem 1½ft. to 2ft. high, slender, terete, glabrous, sometimes slightly mottled with purple. Philippine Islands. (B. M. 6250.)

L. polyphyllum (many-leaved). *fl.* waxy-white, copiously spotted and lined with purple, 1½in. to 2in. long, drooping, about four to six in a loose raceme; peduncles 2in. to 4in. long, stiff. Summer. *l.* all scattered, thirty to forty to a stem at the flowering time, much-ascending, linear-lanceolate; the lower ones 4in. to 5in. long, acute. Stem 2ft. to 3ft. high, moderately stout,

FIG. 425. FLOWER OF LILIUM PYRENAICUM.

Lilium—*continued.*

terete. Temperate Western Himalaya, 1873. A rare and handsome greenhouse species.

FIG. 426. LILIUM ROSEUM, showing Habit and detached Portion of Raceme.

L. pomponium (Pompone).* *fl.* bright red or tinged with orange, about twenty, arranged in a broad, rather regular, thyrsoid raceme, which is sometimes 1ft. long and broad; lower pedicels 3in. to 4in. long. Summer. *l.* always scattered, very numerous, as many as 100 to a stem, ascending; lower ones 3in. to 4in. long, ⅛in. to ⅛in. broad at the middle, narrowed gradually to the point; edges inrolled, distinctly ciliated. Stem 1½ft. to 3ft. high, strong,

FIG. 427. LILIUM SPECIOSUM ROSEUM.

Lilium—*continued.*

stiff, erect, finely furrowed. Northern Italy and Southern France, &c., 1659. See Fig. 424. (B. M. 971.)

L. pseudo-tigrinum (false tiger-spotted).* *fl.* in four to six-flowered loose racemes; perianth beautiful scarlet, copiously dotted with black within; segments ovate-lanceolate; pedicels erecto-patent; filaments scarlet; anthers red; styles scarlet. July. *l.* scattered, linear, broad, recurved, spreading; margins revolute. Stem 3ft. to 4ft. China, 1867. (R. H. 1867, 410.)

L. pulchellum (pretty). A synonym of *L. concolor pulchellum.*

L. pumilum (dwarf). A synonym of *L. tenuifolium.*

L. pyrenaicum (Pyrenean).* *fl.* bright yellow, 1½in. to 2in. long, pendulous, forming, in well-grown plants, a raceme of about twelve blossoms; lowest peduncles 3in. to 4in. long. Summer. *l.* always scattered, very numerous, as many as 100 to a stem, erecto-patent, acute; edge slightly inrolled, distinctly minutely-ciliated. Stem 2ft. to 4ft. high, strong, stiff, erect, finely furrowed. Pyrenees, 1596. See Fig. 425. This is closely allied to *L. pomponium*, under which it is placed as a sub-species by Mr. Baker in his revision of the Liliums published in the "Journal of the Linnean Society."

L. Roezlei (Roezl's). *fl.* one to ten, corymbose or umbellate; perianth of a fine reddish-orange colour, 2in. to 3in. long; segments acuminate, about ½in. broad, yellow below, dotted with purple, reflexed. *l.* twenty to thirty, sometimes partly whorled, firm, glabrous, narrow-linear, acute; lower one 4in. to 5in. long, about ½in. broad. Stem 2ft. to 3ft. high, slender, glabrous. California, &c., 1871. (R. G. 667.)

L. roseum (rose-coloured).* *fl.* lilac, handsome, large, drooping, racemose; perianth between campanulate and infundibuliform; sepals free to their base, almost spathulate, with reflexed apices. April. *l.* crowded at the base of the stem, but alternate, sessile, linear, acuminate, grassy; the lower ones 1ft. to 1½ft. long, upper ones gradually passing into bracts. Stem 1½ft. high, erect, terete, glabrous. Gossain Than and Kumaon. See Fig. 426. (B. M. 4725; B. R. 1845, 1, under name of *L. Thomsonianum*.)

L. rubescens (reddish). A synonym of *L. Washingtonianum purpureum.*

FIG. 428. FLOWER-STEM OF LILIUM TESTACEUM.

L. sinicum (Chinese). A synonym of *L. concolor.*

L. speciosum (showy).* *fl.* pure white, or more or less suffused and copiously spotted with claret-red, 3in. to 5in. long, usually three to ten in a broad deltoid raceme; peduncles bracteate, rigid, erecto-patent. Summer. *l.* about twenty at the flowering time; lower ones ovate or ovate-lanceolate, 6in. to 9in. long, 1½in. to 2in. broad below the middle; upper ones lanceolate. Stem 1ft. to 3ft. high, rigid, erect, terete. Japan, 1832. A well-known and extensively cultivated species, varying considerably in the size and colouring of the flowers. It is most commonly known under the erroneous specific name of *L. lancifolium*, but the plant to which this name correctly belongs

Lilium—*continued.*

is *L. elegans.* (B. M. 3785; B. R. 2000; F. d. S. 276; P. M. B. v. 267.)

L. s. albiflorum (white-flowered).* A very desirable form, with pure white flowers.

L. s. punctatum (spotted).* A variety having the white perianth segments not suffused, but only spotted with red.

L. s. roseum (rose-coloured).* A handsome variety, with rose-tinted flowers. See Fig. 427.

FIG. 429. FLOWER-STEM OF LILIUM TIGRINUM.

L. spectabile (showy). A synonym of *L. davuricum.*

L. superbum (superb).* *fl.* orange-red, thickly spotted, from 3in. to 4in. long, often six to twelve, sometimes twenty to forty, disposed in a deltoid panicle 9in. to 12in. broad. July and August. *l.* often disposed in three or four or eight to ten-foliate whorls, few or much scattered, narrow-oblanceolate, acute, rather firm; lower ones 4in. to 5in. long, ½in. to ¾in. broad. Stem 4ft. to 6ft. high, robust, upright, tinged with purple. Georgia, &c. (B. M. 936; F. d. S. 1014-15.)

L. s. carolinianum (Carolina). *fl.* like those of the type. *l.* much fewer, broader, and shorter, often five or six disposed in a whorl near the middle of the stem. Stem 1ft. to 2ft. high. Southern United States. SYNS. *L. autumnale* (L. B. C. 335), *L. carolinianum* (B. M. 2280; B. R. 580), and *L. Michauxianum.*

L. Szovitsianum (Szovits'). A synonym of *L. monadelphum Szovitsianum.*

L. tenuifolium (narrow-leaved).* *fl.* usually solitary, rarely two, drooping or sub-erect, bright scarlet, about 1¼in. long. Summer. *l.* closely placed, much-ascending, thirty to fifty to a stem at the flowering time, linear-subulate, 1½in. to 2in. long, not more than a line broad. Stem 6in. to 12in. high, very slender. Siberia, 1820. An elegant species. SYNS. *L. linifolium* and *L. pumilum.*

L. testaceum (light brown). *fl.* yellow, tinged with dull red, 2½in. to 3in. deep, the lowest quarter connivent in a permanent cup; raceme rather regular, thyrsoid, usually from one to six, but sometimes twelve-flowered. End of July. *l.* always scattered, very

Lilium—*continued.*

close, sixty to a hundred to a stem at the flowering time, erecto-patent, linear. Stem reaching 5ft. to 6ft. in height, comparatively slender and wand-like, finely striated. 1841. SYNS. *L. excelsum* and *L. isabellinum*. A garden plant, probably a hybrid between *L. candidum* and *L. chalcedonicum*. See Fig. 428. (B. R. 1843, 11; F. d. S. i. 39; P. M. B. 1843, 221; R. G. 349.)

L. Thomsonianum (Thomson's). A synonym of *L. roseum*.

L. Thunbergianum (Thunberg's). A synonym of *L. elegans*.

L. T. aureum nigro-maculatum (yellow, black-spotted). A synonym of *L. elegans alutaceum*.

FIG. 430. INFLORESCENCE OF LILIUM TIGRINUM SPLENDENS.

L. tigrinum (tiger-spotted).* Common Tiger Lily. *fl.* bright deep orange-red, with numerous small, distinct, purplish-black spots 2½in. to 4in. long; racemes deltoid, eight to twenty-flowered, 8in. to 9in. broad; lateral peduncles rigidly erecto-patent. July and August. *l.* twenty to thirty at the time of flowering, linear, scattered irregularly, erecto-patent or spreading, dark glossy green. Stems 2ft. to 4ft. high, erect, firm, robust, purplish-black, pubescent. China, 1804. A well-known and very desirable species. See Fig. 429. (B. M. 1237.)

L. t. flore-pleno (double-flowered).* *fl.* bright orange-red, densely spotted with blackish-purple; perianth segments multiplied into about six series. Habit somewhat similar to *Fortunei*. Japan. (F. & P. 1871, 25.)

L. t. Fortunei (Fortune's).* This fine variety differs from the type in its greater stature, its larger pyramidal heads, and its more conspicuous cobwebby pubescence. Stems 6ft. to 7ft. high, the upper 2ft. and upwards forming a broad pyramidal panicle of flowers. China, 1850.

FIG. 431. FLOWER-STEM, IN TWO PARTS, AND DETACHED FLOWER OF LILIUM WASHINGTONIANUM.

L. t. splendens (splendid).* *fl.* sometimes twenty-five to a stem, of a bolder character than in *Fortunei*; spots fewer and larger. A fine variety. See Fig. 430. (F. d. S. 1931-2; F. & P. 1873, 15.)

Lilium—*continued.*

L. tubiflorum (tube-flowered). A synonym of *L. neilgherrense*.

L. Wallichianum (Wallich's). *fl.* white, greenish towards the base outside, fragrant, usually solitary, casually two or three; 7in. to 9in. long. Summer. *l.* fifty to sixty, always narrow-linear, ascending, the lower reaching 8in. to 9in. long. Stem 4ft. to 6ft. high, ½in. thick at the base. Sub-temperate Central Himalayas. Greenhouse. (B. M. 4561; F. d. S. 612; L. & P. F. G. 1850, 120.)

L. Wallichianum (Wallich's), of Wight. A synonym of *L. neilgherrense*.

L. Washingtonianum (Washington's).* *fl.* white, tinged with purple or lilac, all more or less cernuous when expanded, fragrant, 2½in. to 3½in. long, narrowed gradually from the neck to the base; racemes about 1ft. long on strong-growing specimens, and from 8in. to 9in. broad when fully expanded. Summer. *l.* in several distinct whorls, which are 3in. to 4in. apart in the lower part of the stem, and made up of about one dozen ascending oblanceolate leaves, which are 4in. to 5in. long. Stem 3ft. to 5ft. high, ⅜in. to ½in. thick towards the base, stiff, erect, terete. California, 1872. See Fig. 431. (F. d. S. 1975-6; G. C. 1871, p. 709; R. G. 170.)

L. W. purpureum (purple). *fl.* purplish-black, spotted, umbellate. Stem 1ft. to 1½ft. high. California, 1873. SYN. *L. rubescens*. (F. d. S. 1975-6; R. G. 170.)

LILY BEETLE (*Crioceris merdigera*). In this beetle, the antennæ are borne on the front of the head, and the joints are short; the mandibles are short, and are provided with several teeth; the palpi are slender, and the elytra rather broad. The colour is bright scarlet during life, but fades rapidly after death. The larvæ live on Lilies, devouring the leaves. They form a protective coat by pushing their excrement upon their backs

FIG. 432. LILY BEETLE (CRIOCERIS MERDIGERA), showing Eggs, Larvæ (one naked, the other under its Coat), and Perfect Insect.

there to dry into a crust (see Fig. 432); they can free themselves at pleasure from this coat. They descend into the earth when the time arrives for them to become pupæ. Lily Beetles are very rare; but, when troublesome, the best plan to effect a clearance is to pick them off by hand and to throw them into hot water. White Hellebore has been found a quick and good method of getting rid of these insects. It should be applied as recommended for the **Gooseberry and Currant Sawfly** (which *see*).

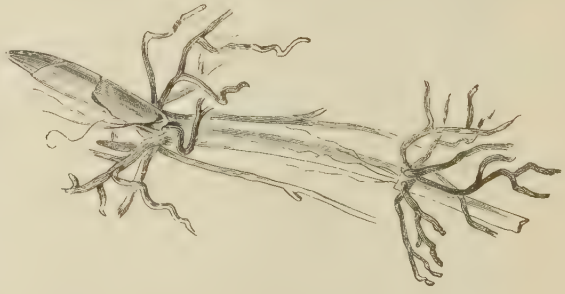


FIG. 433. YOUNG CROWN OF LILY OF THE VALLEY, FOR PROPAGATING.

LILY OF THE VALLEY (*Convallaria majalis*). The pure white, fragrant flowers, and pale green foliage of this beautiful native plant render it one of the most useful and universally admired. It succeeds outside in almost any situation, but prefers one with shade and plenty of moisture. When once planted and become established, the crowns keep increasing, and the larger ones flowering, each year without any attention, beyond the application of a top-dressing of manure or rich soil in the autumn. The plants are not particularly ornamental

Lily of the Valley—*continued.*

at any season except during spring and early summer; consequently, a place should be selected for their cultivation which is not too prominently exposed. In some parts of England, Lilies of the Valley are found, in any quantity, growing wild in woods; the shade and moisture there secured being suitable to their requirements. Where the plants are not found wild, they may readily be naturalised, if the position is not too dry, nor the herbage very thick. As grown outside, this plant is essentially a subject for supplying cut flowers, and these are always popular, and in great demand for bouquets of every description. Cultivated in pots, and forced into flower early in spring, the Lily of the Valley constitutes an invaluable subject for greenhouse and room decoration. The natural flowering season is April and May, according to the locality; by obtaining a plentiful supply of crowns, and forcing carefully, the season may commence inside early in December, and a succession of flowers be secured thenceforth until June. Lilies of the Valley may be propagated by seeds, which ripen freely if allowed, and should be sown in spring, outside. The usual method of propagation is by the numerous crowns which form at the points of creeping roots or underground stems (see Fig. 433). If clumps are allowed to grow undisturbed, the crowns become too thickly crowded, and do not produce such fine flowers as when more space is afforded.

Preparation of Crowns for Forcing. Size, and, consequently, good quality, in the flowers of the Lily of the

FIG. 434. FLOWERING STEM OF LILY OF THE VALLEY.

Valley (as represented in Fig. 434) depend entirely on the cultivation and attention given to the preparation of the crowns. Immense quantities of these are annually imported from Germany, to meet the demand for forcing purposes in this country. It is important to observe that those coming from Berlin are far better for early forcing than those received from Hamburg. The latter are generally much larger, but, for some reason, they cannot be depended upon to start well before January at the earliest. By adopting a system of annually preparing crowns for forcing, excellent ones, equal in every respect, if not superior, to those imported, may be obtained in this country. The following is a

Lily of the Valley—*continued.*

method which may be pursued: Select or prepare a piece of good ground in a border, with either an east or a west aspect. It should be manured and well trenched. The crowns should be lifted in autumn, or at any time before growth commences in spring, and placed together according to their sizes. In planting, a shallow trench should be cut out, the crowns placed upright in it, about 2in. apart, so that their points are just below the surface, and the soil filled in. Other trenches may then be prepared and planted in a similar way, leaving a space of about 9in. between them. Hoeing occasionally, to keep the surface open and clean, and watering in dry weather, until the leaves die away, will be all that is necessary afterwards. Crowns thus treated may be lifted for forcing the following winter, if required; but they are much stronger if allowed to remain until the second year. Young crowns being so freely produced, it is not usually difficult to obtain a supply from reserve clumps or borders where the ordinary system has been in practice. The sizes of crowns aged respectively one, two, and

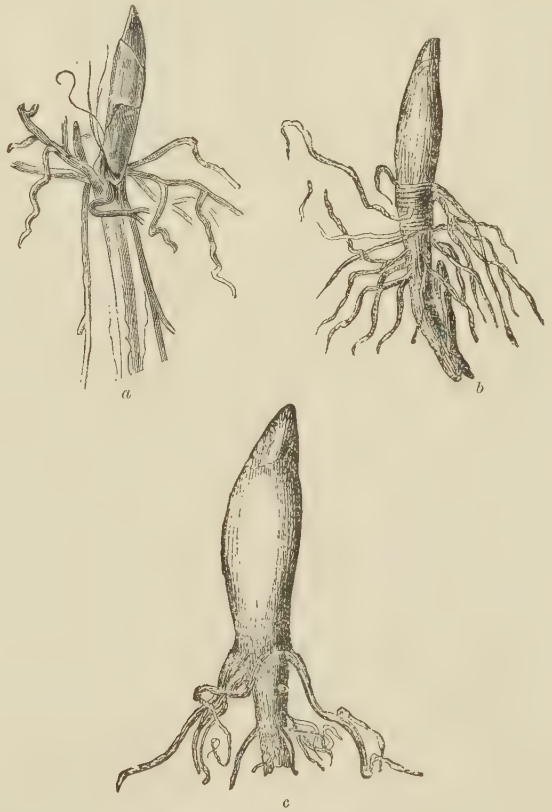


FIG. 435. CROWNS OF LILY OF THE VALLEY.

Preparation for Forcing.

a, One Year Old; *b*, Two Years Old; *c*, Three Years Old.

three years, are represented at *a*, *b*, and *c*, Fig. 435. The first, or small size, lifted at any time when at rest, in winter, will produce nothing beyond leaves the following year. From the second size, flowers of medium strength may be obtained. The large ones will be certain to flower, either indoors or outside, if placed under proper treatment. Clumps for forcing are prepared by planting a few crowns in a bunch, and allowing them to grow for two or three years previous to lifting. It will be seen that many of the crowns in such clumps cannot be of a

Lily of the Valley—*continued.*

similar age and size to those first planted, and, consequently, do not produce such large flowers.

Forcing. Either home-grown or imported Berlin crowns should be used for early forcing. They should be placed rather thickly in pots or boxes, and a little light soil or cocoa-nut fibre lightly shaken amongst the roots, but not over the tops; they should be covered with moss. Another plan is to insert them similarly in propagating frames, and pot up as they come into flower. The roots do not grow during this period; consequently, it is immaterial which method is adopted. Plunge in a bottom heat of about 85deg., and, if possible, maintain a surface temperature of 10deg. less. This encourages the production of leaves and flowers at the same time—conditions not readily obtained with the earlier supplies. If pots or boxes are used, empty ones of a similar size may be inverted over them, to keep the crowns in a darkened position. This is considered beneficial in assisting to start them into growth. When close frames are used, similar conditions may be secured by covering the sashes, so as to exclude light. It is important that the soil be placed as lightly as possible round the roots, in order that the heat may pass readily through it. Water, of the same temperature, should be given often enough to keep the whole well moistened. Bottom heat from an inclosed water tank, with pipes lying in it, is always more evenly distributed, and not of such a drying nature as when the pipes are amongst the plunging or draining material. The very earliest batch not unfrequently fails; but if the crowns are good, and proper attention is given in forcing, each of the later ones may generally be relied upon to produce good flowers. An excellent plan for obtaining leaves is to put in a few ordinary small crowns along with the larger ones. Clumps are forced in quantity later in the season; some of them, if well ripened, may be utilised at any season, where the purchasing or home cultivation of single crowns is impracticable. Lilies of the Valley, severely forced, are not of much further use; plants only gradually forwarded in spring, if put in the open ground after flowering, will recruit their strength again by the second year.

Varieties. Besides the typical plant so largely grown under the familiar name of Lily of the Valley, there are a few varieties, not, however, possessing any particular merit. A larger-growing form is known as *major*, and a rose-coloured variety is sometimes termed *rubra*. The variety with double flowers is not worth cultivating. There is a very ornamental form with golden-variegated leaves, which are attractive when the markings are well developed.

LILY THORN. *See* **Catesbæa.**

LIMATODES. Included under **Phaius** (which *see*).

LIMAX. *See* **Slugs.**

LIMB. The flat expanded part of a petal.

LIME. The application of Lime as a manure to certain soils has long been practised, and has been attended with excellent results, in rendering them productive, and bringing, by its chemical action, the component parts into a proper condition for being absorbed by the roots of plants. Lime is not naturally found in a free state, but is plentiful in combination with carbonic acid, forming what is termed Carbonate of Lime. In the process of burning usually adopted, the carbonic acid is driven off, and the substance left (Quicklime) has a powerful affinity for water, either for absorbing it rapidly when placed in contact, or more slowly from the atmosphere. Quicklime is extremely caustic, and possesses the power of decomposing animal and vegetable substances; hence its fertilising value on soils containing a large quantity of inert vegetable matter, such as recently broken-up grass land, or that where there is a quantity of peat, consisting of roots and fibres, that would otherwise long remain in an undecomposed state.

Lime—*continued.*

Lindley, in his "Theory of Horticulture," states that "when this substance (Lime) is mixed with decaying matter, it hastens its decomposition, and renders it more easily assimilable by plants. This is its chief horticultural value, if regarded as a manure. In old cultivated land, rich in humus, it suddenly increases productiveness in a remarkable degree; increasing the properties of dormant animal or vegetable manure. Hence it has a most important effect in kitchen gardens. But Limed land soon loses its productiveness unless manure is subsequently applied, and poor soils are soon run out by it. To some plants, such as many Conifers, it is injurious; to others it appears to be an indispensable article of food, such as Potatoes, Sainfoin, Barley, Beetroot, Peas, Clover, &c." Although Lime itself is thus apparently a necessary element in the food of many plants, it is more especially valuable in soils by rendering other constituents soluble, and reducing them to a state in which they may be absorbed and assimilated. In applying Lime to any land, some caution is necessary, as it possesses the important property of expelling or setting free ammonia, one of the indispensable constituents of plant-food. Where farmyard manure has long been used, a light application of Lime may be of great advantage in hastening decomposition; while, on the other hand, soils which contain but a small amount of organic or vegetable matter, might, by similar dressings, become exhausted. Peat and clay soils, or those recently broken up after forming grass-land, are acted upon most beneficially by Lime, the effect produced depending greatly on the amount of organic matter contained in each. It should be applied as a top-dressing, or be well incorporated near the surface of the soil. One of the best methods is to form a compost of spare earth, weeds, or organic refuse of any description, for spreading over the ground, and mix a large proportion of Lime with it. The latter substance contributes its own fertilising effects to the mixture, and, at the same time, exerts its influence in many other ways. The application of Lime has been recommended, in some cases, to the extent of 200 bushels to an acre; but a quarter or half of this quantity will, perhaps, in the majority of instances, be sufficient to effect the desired purpose. An experiment should be made with a small portion of ground, in the first place, and, if the results prove favourable and marked, a larger portion might be treated under similar or altered conditions, according to the amount of success attained. The presence of Lime in the soil is very hurtful to Rhododendrons, and many other hard-wooded plants of a like nature, grown in the open air. It is also most destructive to hard-wooded Cape and Australian plants, cultivated in sandy-peat soil, under glass. Lime being, to a certain extent, soluble in water, the use of that which contains any large proportion should, if possible, be avoided in the cultivation of all the plants just referred to. Rain-water contains much less than any other; consequently, it should be preserved and utilised to the fullest extent in preference to that obtained from wells, springs, or other sources.

LIME, CHLORIDE OF. *See* **Chloride of Lime.**

LIME, SWEET. *See* **Citrus Limetta.**

LIME-TREE. *See* **Tilia.**

LIME, WEST INDIAN. *See* **Citrus medica acida.**

LIMNANTHEÆ. A tribe of *Geraniaceæ*.

LIMNANTHEMUM (from *limne*, a marsh or pool, and *anthemon*, a blossom; referring to the natural habitat of the species). Floating Heart. SYNS. *Schweyckerta*, *Waldschmidia*. ORD. *Gentianeæ*. About two dozen species have been referred to this genus; these may probably be reduced to about ten. They are ornamental aquatic plants, closely allied to *Villarsia*, widely dis-

Limnanthemum—*continued.*

persed over the temperate and warmer regions of the globe, seven being natives of Australia. Flowers yellow or white; peduncles one-flowered, either in the tufts of leaves, or two together, or clustered at the nodes of the weak stems, or close to an almost terminal sessile leaf; corolla sub-rotate, the lobes five, entire or fringed. Capsule indehiscent or bursting irregularly when ripe. Leaves ovate or orbiculate, deeply cordate, entire or obscurely sinuate. For culture, *see* **Villarsia.**

L. indicum (Indian). *fl.*, corolla yellow, the margins fringed. *l.* orbicular or broadly oval, deeply cordate, usually entire, with a close or open sinus, coriaceous, palmately veined and reticulate, but the veins not prominent. North Australia. SYN. *Menyanthes indica* (under which name it is figured in B. M. 658). *L. Ecklonianum, L. Forbesianum, L. Humboldtianum, L. orbiculatum,* and *L. Thunbergianum,* are probably forms of this species.

L. nymphæoides (Nymphæa-like).* *fl.*, corolla yellow; segments ciliated; umbels sessile, terminal, or in the forks of the stems. Summer. *l.* opposite, cordate-orbicular or orbicularly reniform, repand. Britain. A very beautiful hardy aquatic, but somewhat difficult to eradicate when once established. SYN. *Villarsia nymphæoides.* (Sy. En. B. 921.)

FIG 436. FLOWERING BRANCH OF LIMNANTHES DOUGLASII.

LIMNANTHES (from *limne*, a marsh, and *anthos*, a flower; in reference to the habitat of the plants). ORD. *Geraniaceæ.* A small genus (two species) of diffuse, glabrous, hardy annuals, natives of California. Flowers white, yellowish, or pink, regular; peduncles axillary, one-flowered; petals five, sub-perigynous, contorted; sepals five, valvate. Leaves alternate, cut, exstipulate. The undermentioned species is well adapted for beds,

Limnanthes—*continued.*

edgings, rockeries, &c. Propagated freely by sowing seeds in any ordinary garden soil, in March, for summer, and in September, for spring, flowering.

L. Douglasii (Douglas's).* *fl.* yellow, passing off to white streaked with grey, sweet-scented. Spring to autumn. *l.* pinnate, with an odd or terminal three-cleft leaflet. *h.* 8in. 1833. A very showy annual, with a spreading habit and prostrate stems. See Fig. 436. (B. M. 3554; B. R. 1673.) Two or three varieties, differing slightly from the type in colour and size of flower, are mentioned in seed catalogues.

LIMNOCHARIS (from *limne*, a marsh, and *charis*, grace, beauty; alluding to the habitat and appearance of the plants). ORD. *Alismaceæ.* A genus consisting of three or four species of stove, greenhouse or half-hardy herbaceous perennial aquatics, natives of tropical America. Flowers yellow, on long stalks. Leaves fasciculate, swimming, ovate or cordate-orbicular. *L. Plumieri,* the only species in cultivation, is a handsome stove or greenhouse aquatic. It should be grown in tubs or cisterns, or in the shallow part of an aquarium. Propagation may be effected by divisions, by runners, or by seeds.

L. Plumieri (Plumier's).* *fl.* yellow, six to ten in an umbel; scape and peduncles three-sided, the former purple, green at top, the latter with reddish angles. June to November. *l.* oblong, very blunt at each end; petiole three-sided, sheathing at base, purple below, green above. *h.* 1½ft. Brazil, 1822. (B. M. 2525.)

LIMODORUM TUBEROSUM. *See* **Calopogon pulchellus.**

LIMONIA (from *Limuna*, the Persian name of the Citron). ORD. *Rutaceæ.* This genus comprises two or three species of small trees or shrubs, often spiny, natives of tropical Asia. Flowers fasciculate or racemose. Berry globose. Leaves alternate, trifoliolate or impari-pinnate; leaflets opposite, entire or crenate; petioles winged. The species thrive in a compost of peat, loam, and dried cow-dung, with a few small pieces of charcoal added. Propagated by cuttings, made in spring or summer, and placed in sandy soil, under a glass, in very gentle bottom heat; or by seeds, sown on a hotbed, during spring.

L. acidissima (very acid). *fl.* white, fragrant, in sub-umbellate racemes. *fr.* yellowish, afterwards changing to reddish or purplish. *l.* pinnate, with winged stalks. India. *h.* 8ft. to 10ft. A spiny shrub or small tree. The Javanese employ the acid, flesh-coloured pulp of the fruits of this species as a substitute for soap.

LIMONIASTRUM (from *leimon*, a meadow, and *aster*, a star; in allusion to the starry flowers, and the habitat of the plants). SYN. *Bubania.* ORD. *Plumbagineæ.* A genus comprising only a couple of species of greenhouse or nearly hardy small shrubs or sub-shrubs, natives of the Western Mediterranean region. Calyx tubular; corolla blue, funnel-shaped, with a five-lobed, spreading limb; scapes or peduncles dichotomously branched. Leaves crowded on the stem or alternate on the branches, narrow, entire. The undermentioned plants are nearly hardy shrubs. For culture, *see* **Statice** (with which the species are sometimes confused).

L. monopetala (one-petaled). *fl.* solitary, borne in scaly paniculate spikes; corolla salver-shaped, with a very long curved tube; calyx scarcely enlarging after flowering. July to September. *l.* linear-spathulate, sheathed at base. Stem leafy. *h.* 3ft. Sicily, 1731. All the green parts of the plant are covered with white disks of calcareous matter. SYN. *Statice monopetala* (under which name it is figured in B. R. 1841, 54).

L. m. denudata (naked). A well-marked variety, differing from the type in having paler and smaller flowers, a more drawn-up habit, broader leaves, which are somewhat wavy at the edge, and a much smaller quantity of calcareous matter. SYN. *Statice monopetala denudata* (under which name it is figured in B. R. 1842, 59).

LINARIA (from *Linon*, Flax; referring to the resemblance in the leaves). Toadflax. ORD. *Scrophularineæ.* A large genus (about 150 species) of usually hardy herbs, rarely sub-shrubs, broadly dispersed through the extra-tropical Old World regions of the Northern hemisphere, one being found in extra-tropical North and South

Linaria—*continued.*

America. Flowers spicate or racemose, or solitary and axillary; corolla tube furnished with a spur at the base; palate more or less bearded, usually prominent at the throat, but sometimes depressed, and not closing the throat; upper lip erect, lower one trilobate. Leaves opposite or whorled, the uppermost often alternate. All the species of this genus are of easy culture in any moderately good, well-drained soil; the dwarfer plants are admirably adapted for the rock-garden, and for margins of borders. Propagated freely by divisions, in spring or autumn; or by seeds, sown on a light soil, during March or April.

L. æquitriloba (equally three-lobed). *fl.* purple; floriferous pedicels nearly as long as the leaves; calyx segments linear-lanceolate. June. *l.* mostly opposite, small, cordate-reniform, three (rarely five) lobed; lobes short, round, very shortly mucronate. Sardinia, &c., 1829. A small evergreen. (B. M. 2941.)

L. alpina (alpine).* *fl.* bluish-violet, with a rich golden centre, disposed in sub-capitate racemes; spur equal in length to the corolla, sometimes straight, and sometimes incurved, acute. Summer and autumn. *l.* linear or linear-lanceolate, thickish, four in a whorl. *h.* 6in. Alps of Europe. An exceedingly pretty little herbaceous perennial, forming dense compact tufts; it is one of the best for growing on rockwork. (F. d. S. 2128.)

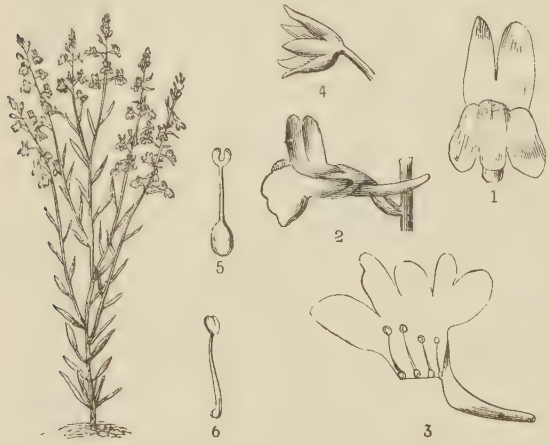


FIG. 437. LINARIA BIPARTITA, showing Habit, and (1) Front View of Flower, (2) Side View, (3) Corolla laid open, (4) Calyx, (5) Style and Ovary, and (6) Stamen.

L. bipartita (twice-parted).* *fl.* violet-purple, disposed in loose racemes; palate orange-coloured, whitish at the base; spur arched, scarcely exceeding the corolla. June to September. *l.* linear or linear-lanceolate, flat, alternate or verticillate. *h.* 1ft. Portugal, 1815. Annual. See Fig. 437. (S. B. F. G. 30.)

L. canadensis (Canadian). *fl.* violet, loosely racemose; pedicels erect, not longer than the curved corolla spur; calyx segments oblong-lanceolate, acute, shorter than the corolla tube. July. *l.* remote, linear. *h.* 6in. to 2ft. North America, 1812. Annual. (B. M. 3473.)

L. crassifolia (thick-leaved).* *fl.* pale but bright blue-purple, with a yellow palate and red-purple throat, large. *l.* ovate, acutish, glabrous, thickish. *h.* 3in. to 6in. South-west Europe. (B. M. 5733, under name of *L. origanifolia crassifolia.*)

L. Cymbalaria (Cymbalaria).* Mother of Thousands. *fl.* pale blue or lilac, small, with short spurs, which are a little recurved. Spring to late autumn. *l.* mostly alternate, cordately-reniform, five to seven-lobed; lobes rounded or cuneiform, mucronulate. Branches prostrate, creeping, and rooting. Roots rhizomatous, emitting fibres. Europe (Britain). A very pretty and well-known perennial climber, of which there are two desirable varieties; one with pure white flowers, and another with variegated leaves. (Sy. En. B. 955.)

L. dalmatica (Dalmatian).* *fl.* yellow, large, few, and loose, at the summits of the branches; spur straight, much shorter than the corolla. Summer. *l.* oblong-lanceolate or linear-lanceolate, acute. Branches erect or decumbent, densely clothed with leaves. *h.* 3ft. to 4ft. South-eastern Europe, &c., 1731. A handsome and vigorous-growing perennial. (B. R. 1683.)

L. genistæfolia (Genista-leaved). *fl.* pale yellow, paniculately racemose; spur rather straight, equal in length to the corolla. Summer and autumn. *l.* lanceolate, acute, three to five-nerved, somewhat stem-clasping. Stem branched. *h.* 2ft. to 4ft. Europe, Asia Minor, 1704. Perennial. (B. M. 2183.)

Linaria—*continued.*

L. hepaticæfolia (Hepatica-leaved).* *fl.* lilac-purple, with the pedicels longer than the leaves; calyx segments linear-acute; spur shorter than the tube. Summer. *l.* cordate-reniform, three to five-lobed, glabrous. Corsica. A very pretty floriferous perennial, 1in. to 2in. high; it forms a neat dense carpet for rockwork, &c.

L. heterophylla (variable-leaved). *fl.*, corolla pale straw-colour, 1in. long; calyx longer than the pedicel; racemes usually branched at base. July. *l.* scattered, spreading, 1in. to 2in. long, narrow-linear or acicular, obtuse, rarely narrowly elliptic-lanceolate, rather fleshy, one-nerved. *h.* 2ft. to 3ft. Marocco, 1871. Annual. (B. M. 6041.)

L. macroura (long-tailed).* *fl.* yellow, with a more intense-coloured villous palate, large, disposed in long, straight, dense racemes; spur straight, length of corolla or a little longer. Summer and autumn. *l.* linear, flat, glaucous. *h.* 1ft. to 1½ft. Orient, 1822. Plant erect, branched or simple.

FIG. 438. LINARIA MARITIMA.

L. maritima (maritime). *fl.* pale yellow, with an orange palate; spur as long as corolla. Summer. *l.* linear, scattered or sometimes whorled, glaucous, glabrous. *h.* 6in. to 12in. South-west Europe. Annual. See Fig. 438.

FIG. 439. LINARIA MAROCCANA, showing Upper Portion of Plant and detached Flower, Calyx, and portion of Stem with Glandular Hairs.

L. maroccana (Marocco). *fl.* bright violet-purple, disposed in long racemes. June. *l.* linear, those of the primary shoots whorled. *h.* 9in. Marocco, 1872. Annual. See Fig. 439. (B. M. 5983.)

L. origanifolia (Origanum-leaved). *fl.* bluish-violet, with a yellow throat, alternate, distant, forming a loose raceme. Summer and autumn. *l.* oblong or obovate, on short petioles; lower ones opposite, upper ones alternate. South-west Europe, 1785. Plant ascending, annual.

L. o. crassifolia (thick-leaved). A synonym of *L. crassifolia.*

L. purpurea (purple).* *fl.* bluish-purple, mouth of corolla bearded with white hairs along the edges, tube striped with purple, dis-

Linaria—*continued.*

posed in loose elongated racemes; spur arched, length of corolla. July to September. *l.* linear or linear-lanceolate; lower ones four to nine in a whorl, upper ones three in a whorl. *h.* 1ft. to 3ft. South Europe, 1648 (naturalised in Britain). Plant glabrous, branched, erect. A good perennial for growing on old walls, &c. (B. M. 99; Sy. En. B. 960.)

FIG. 440. PORTION OF INFLORESCENCE, DETACHED FLOWER AND LEAF, OF LINARIA TRIORNITHOPHORA.

L. reticulata (reticulated).* *fl.* deep purple, reticulately veined; palate copper-coloured or yellow, marked with deep purple lines; spur shorter than the corolla; raceme crowded, short, downy, tapering upwards. May to July. *l.* linear, channelled; lower ones verticillate, upper ones scattered. *h.* 2ft. to 4ft. Portugal, 1788. Annual. (B. H. ii. 48.) The variety known as *aurea purpurea* is a very distinct and pretty novelty, with deep rich purple and orange flowers.

FIG. 441. LINARIA VULGARIS PELORIA, showing Habit and detached Single Flower.

L. sagittata (arrow-shape-leaved). *fl.* yellow, axillary, solitary, on capillary pedicels often exceeding the leaves; sepals lanceolate, acute; corolla 1½in. long, lips very broad. June. *l.* scattered, distant, petioled, 1in. to 1½in. long, lanceolate-oblong or linear, with a hastate base, quite entire. Stems very slender, 6ft. to 10ft. long. Marocco, 1871. Perennial. (B. M. 6060.)

L. saxatilis (rock). *fl.* yellow, palate usually marked with two fulvous spots or lines, disposed in sub-capitate heads; spur short, acute. August. *l.* thickish; lower ones four in a whorl, almost lanceolate; upper ones alternate, linear-lanceolate. Spain, 1819. Plant clothed with clammy down, procumbent. A pretty trailing perennial.

L. spartea (Spartium-like).* *fl.* deep yellow, on long pedicels; spur straight; raceme few-flowered, glabrous, or clothed with short clammy down. Summer and autumn. *l.* linear-lanceolate, erect; lower ones often three in a whorl, upper ones alternate. Spain, &c., 1772. A pretty, upright, branched annual.

L. triornithophora (three-birds-bearing).* *fl.* purple, with a yellow palate, 1in. long, usually three or four in a whorl; tube inflated and striated. June to September. *l.* lanceolate, acute, quite glabrous. Branches erect, decumbent at top. Portugal and Spain, 1710. A desirable and pretty perennial. See Fig. 440. (F. d. S. 2297.)

L. tristis (sad). *fl.* yellow, with a dark purple or brown mouth, approximate, sometimes nearly opposite; spur thick, striated, arched at the base, about equal in length to the corolla. July and August. *l.* linear or linear-oblong; lower ones three or four in a whorl, upper ones opposite or alternate. Portugal and Spain, 1722. A very pretty decumbent annual. (B. M. 5827.)

L. vulgaris (common). Common Toadflax. *fl.* pale yellow or citron, disposed in dense spicate racemes; palate copper-coloured; spur curved, about equal in length to the corolla. Spring to autumn. *l.* linear or linear-lanceolate. *h.* 2ft. to 3ft. Europe (Britain), North Asia. A handsome and erect native perennial. (Sy. En. B. 962.) The variety *Peloria*, instead of having one spur, has five; the corolla has become regular through excess of irregularity—a condition more frequently met with in *L. vulgare* than in any other species; it is constant under cultivation, but is rare in the wild state. See Fig. 441.

LINCONIA (said to be a South African name). ORD. *Bruniaceæ*. A genus comprising three species of ornamental, Epacris-like, greenhouse evergreen sub-shrubs, natives of the Cape of Good Hope. Flowers white, solitary, in the axils of the upper leaves; calyx adnate to the ovary; petals lanceolate, not clawed, coriaceous, convolute. Leaves spirally arranged. Branches numerous, erect. For culture, *see* **Diosma.**

L. alopecuroides (fox-tail-like). *fl.* white or flesh-coloured, a little longer than the leaves. May. *l.* spreading a little, linear, acute, almost sessile. *h.* 2ft. 1816.

L. cuspidata (cuspidate-leaved). *fl.* white; bracts equal in length to the calyx, with fringed pilose edges. May and June. *l.* spreading a little, oblong, obtuse, ustulate at the apex, keeled. *h.* 2ft. 1825.

L. thymifolia (Thyme-leaved). *fl.* white. May and June. *l.* ovate-oblong, obtuse, keeled, tipped with black. *h.* 2ft. 1825.

LINDELOFIA (named in honour of Friedrich von Lindelof, of Darmstadt, a patron of botany). SYN. *Anchusopsis*. ORD. *Borragineæ*. A monotypic genus, the

FIG. 442. LINDELOFIA SPECTABILIS, showing Habit and detached Flowers.

species being an erect, scabrous-pubescent or slightly villous, hardy perennial herb. It thrives in any good

Lindelofia—*continued.*

garden soil. Propagation may be effected either by seeds or by division of the roots. The former method is the most productive, but the plants thus raised will not flower until the second season after sowing.

L. spectabilis (showy). *fl.* purple, red; calyx segments twice as short as the corolla tube; racemes ebracteate. May to August. *l.* oblong, acuminate; upper ones cordate-amplexicaul at base. *h.* 1ft. to 1½ft. India, 1839. See Fig. 442. (B. R. 1840, 50, under name of *Cynoglossum longiflorum.*)

LINDENIA (named after J. Linden, a Belgian horticulturist). ORD. *Rubiaceæ.* A genus comprising three species of glabrous or pubescent shrubs, of which two are natives of Mexico and Central America, and the third inhabits the islands of New Caledonia and Fiji. Flowers white, showy, in short terminal cymes, pedicellate. Leaves opposite, shortly petiolate, linear-lanceolate; stipules intrapetiolar. *L. rivalis*, the only species yet in cultivation, is a handsome stove evergreen shrub, remarkable in having a corolla tube 5in. long. It thrives in a loam and peat soil. Propagated by ripened cuttings, inserted in sand, under a bell glass, in heat

L. rivalis (brook-loving).* *fl.* white, with a red tube; corolla of five oblong lobes 1in. long; corymbs small, few-flowered. August. *l.* lanceolate, 2in. to 3in. long, clustered towards the ends of the shoots. *h.* 3ft. Mexico, &c., 1856. (B. M. 5258; G. C. n. s., xvi. 180.)

LINDEN-TREE. *See* **Tilia.**

LINDERA (named after John Linder, a Swedish botanist of the early part of the eighteenth century). Including *Benzoin.* ORD. *Laurineæ.* A rather large genus (about fifty species) of trees and shrubs, natives of tropical and Eastern Asia (extending to Japan), and North America. Flowers diœcious, umbellate or capitate; perianth segments six, petaloid and often small; tube very short; involucre sessile or pedicellate. Berry globose or ovoid. Leaves alternate or almost opposite, penniveined or three to five-nerved, coriaceous and perennial, or slender and annual. For culture of the undermentioned hardy species—probably the only ones grown in gardens—*see* **Laurus.**

L. Benzoin (Benzoin). Benjamin Bush; Spice Bush. *fl.* honey-yellow, in almost sessile, lateral, umbel-like clusters, appearing before the leaves, the clusters composed of smaller clusters or umbels, each of four to six flowers. March and April. *l.* oblong-obovate, pale beneath. *h.* 6ft. to 15ft. North America, 1683. SYN. *Laurus Benzoin.*

L. melissæfolia (Melissa-leaved). Jove's Fruit. *fl.* similar to those of *L. Benzoin*; umbels few. April. *l.* oblong, obtuse, or cordate at base, downy beneath. Young branches and buds pubescent. *h.* 6ft. North America, 1810. SYNS. *Laurus Diospyrus* (B. M. 1470), *Laurus melissæfolia.*

LINDHEIMERA (named in honour of Ferdinand Lindheimer, the discoverer of the plant). ORD. *Compositæ.* A monotypic genus, the species being an erect, scabrous-hirsute, branched, greenhouse or half-hardy annual herb, requiring similar culture to **Zinnia** (which *see*).

L. texana (Texan).* *fl.-heads* yellow, disposed in an irregular leafy corymb; achenes scabrous-tuberculate or slightly hispid; involucral scales in two rows; receptacle flat. August and September. *l.* alternate, oblong, thickly toothed. *h.* 1ft. to 2ft. Texas.

LINDLEYA (named after John Lindley, 1799-1865, a celebrated English botanist). ORD. *Rosaceæ.* A monotypic genus. The species is a half-hardy, evergreen, much-branched, glabrous tree, with the habit of *Pyrus Malus.* It has follicular or capsular fruits and winged seeds, and has its five ovaries consolidated. It thrives in a well-drained loam, and would probably do best in a chalky soil. Propagated by ripened cuttings, placed under a glass, in bottom heat; or by grafting on the Hawthorn.

L. mespiloides (Mespilus-like).* *fl.* white, sweet-scented, hermaphrodite, bracteate, axillary or at the tips of the branchlets, solitary; calyx persistent; petals orbiculate, large; peduncles bibracteolate. July. *l.* coriaceous, scattered, simple, crenulated, petiolate. *h.* 20ft. to 30ft. Mexico, 1843. (B. R. 1844, 27.)

LINDLEYA (of Nees). A synonym of **Laplacea** (which *see*).

LINDSÆA. A synonym of **Lindsaya** (which *see*).

LINDSAYA (named after Archibald Lindsay, an English botanist of the last century). SYN. *Lindsæa.* Including *Diellia, Isoloma* (of J. Smith), *Schizoloma, Synaphlebium.* ORD. *Filices.* A genus comprising about fifty species of very handsome stove or greenhouse ferns, mainly confined within the tropics. Sori marginal or sub-marginal, placed at the apex of and uniting two or more veins; involucre double, opening outwardly, the inner valve membranaceous, the outer formed of the more or less changed margin of the frond. The species are, for the most part, extremely difficult to cultivate for any length of time; and the best plan is to grow them in well-drained pots of fibrous loam and sand, under the same conditions, as regards atmospheric moisture, &c., as those which are found most suitable for Filmy Ferns. Except where otherwise indicated, the species described below require stove treatment. *See also* **Ferns.**

L. adiantoides (Adiantum-like).* *sti.* nearly tufted, black, polished, wiry, 1in. to 2in. long. *fronds* 4in. to 6in. long, about 1in. broad, simply pinnate; pinnæ ¼in. long, about ¼in. deep, the upper imbricated, lower edge straight or slightly curved, upper rounded and broadly lobed about one-third the way down. *sori* marginal in the lobes. Malay Archipelago, &c., 1840. (H. S. F. i. 61c.)

L. concinna (neat). *rhiz.* short-creeping. *sti.* 2in. to 4in. long, wiry, erect. *fronds* 6in. to 12in. long, ¾in. broad, simply pinnate; pinnæ four lines long, two lines deep, very blunt on the outer edge, the upper edge very slightly crenate, upper ones close together but scarcely imbricated. *sori* in a continuous or slightly interrupted line along the upper edge. Philippine Islands and Borneo, 1842. This species is closely allied to *L. cultrata.* (H. S. F. i. 61B.)

L. cultrata (knife-shaped).* *sti.* wiry, flexuose, 3in. to 6in. long. *fronds* 6in. to 12in. long, about 1in. broad, simply pinnate; largest pinnæ ¼in. to ¾in. deep, not imbricated, the lower margin straight or slightly curved, usually upwards, the upper edge slightly lobed, so that the continuity of the line of fructification is broken, sometimes nearly entire. North of India. An elegant little species, yielding a fragrance similar to the Sweet-scented Vernal-grass (*Anthoxanthum odoratum*). (H. S. F. i. 62C, under name of *L. Lobbiana*).

L. divergens (wide-spreading). *rhiz.* creeping, wiry, fibrillose. *sti.* wiry, erect, 4in. to 6in. long, 1½in. to 2in. broad, simply pinnate; pinnæ ¾in. to 1in. long, two to three lines broad, obliquely truncate at the base below, auricled at the base above, margin entire, point bluntish. *sori* in a continuous line along both edges. Malayan Peninsula. SYN. *Isoloma divergens.*

L. dubia (doubtful). *rhiz.* short-creeping. *sti.* close together, wiry, 3in. to 6in. long. *fronds* 4in. to 8in. long, 1½in. to 2in. broad, simply pinnate; pinnæ 1in. long, not more than ¼in. broad; upper edge crenated towards the gradually-narrowing point, even the upper ones with usually ¼in. to ½in. between them, often not truly dimidiate, but with the costa becoming central towards the point. Line of the sori not interrupted till it reaches the crenations of the outer third of the upper margin. Venezuela, Guiana, &c. (H. S. F. i. 64C.)

L. elegans (elegant). A synonym of *L. stricta.*

L. ensifolia (sword-fronded). *rhiz.* creeping, stout, paleaceous. *sti.* 6in. to 9in. long, wiry, flexuose. *fronds* 6in. to 12in. long, 3in. to 4in. broad, with a linear-lanceolate, simple or pinnatifid point, simply pinnate below; pinnæ usually in numerous pairs, all stalked, 1½in. to 6in. long, ¼in. to 1in. broad, linear-acuminate to lanceolate, sterile ones a little toothed. *sori* in a continuous marginal line. Hong Kong, Himalayas, &c. SYN. *Schizoloma ensifolia.* (H. G. F. 62.)

L. falcata (sickle-shaped). *sti.* 3in. to 4in. long, strong, erect, densely paleaceous. *fronds* 1ft. to 1½ft. long, 2in. to 4in. broad, lanceolate, simply pinnate; pinnæ 1in. to 2in. long, ¼in. to ⅜in. broad, linear-lanceolate, falcate, acuminate, slightly undulated at the margin, the upper half rather broader and auricled at the base, the lower ones very short and blunt. *sori* marginal, transversely oblong. Sandwich Islands. SYN. *Diellia falcata.*

L. flabellulata (fan-shaped). *rhiz.* short-creeping. *sti.* wiry, erect, brownish-black, polished. *fronds* 6in. to 12in. long, simple or with one or several pairs of lateral branches; pinnules ¼in. to ½in. long, about ¼in. deep, the lower line nearly straight or decurved, the upper rounded, entire or lobed, point broadly rounded; venation flabellate. *sori* in a continous line, except when interrupted by the lobes. India, China, to North Australia. (H. S. F. i. 63.) *L. tenera* differs from this species only in its thinner texture.

L. guianensis (Guiana).* *rhiz.* short-creeping. *sti.* 6in. to 12in. long, rigid, erect. *fronds* 1ft. to 2ft. long, with an entire point and one to six pairs of lateral erecto-patent branches, 6in. to 9in. long, which are sometimes again branched; pinnules ¼in. long, ¼in. broad, not lobed, and the outer edge bluntly rounded, closely packed and sometimes imbricated. *sori* in a continuous line.

Lindsaya—*continued.*

Tropical America, 1845. A beautiful species, closely allied to *L. trapeziformis.* (H. S. F. i. 62A.)

L. heterophylla (variable-leaved). *rhiz.* short-creeping. *sti.* 4in. to 8in. long, firm, naked, erect. *fronds* 6in. to 12in. long, 3in. to 6in. broad, lanceolate or oblong-deltoid, varying from simply pinnate, with large, linear-lanceolate, entire pinnæ, to bipinnate, with erecto-patent branches, 3in. to 4in. long, with oblong-lanceolate blunt pinnules, ¼in. to 1in. long, ⅛in. broad. *sori* in continuous marginal lines. Neilgherries to Malaya. SYN. *Schizoloma heterophyllum.*

L. horizontalis (horizontal). A synonym of *L. trapeziformis.*

L. lanuginosa (woolly). *rhiz.* stout, creeping, clothed with fibrillose scales. *sti.* stout, erect, 4in. to 6in. long. *fronds* 1ft. to 2ft. long, 3in. to 4in. broad, simply pinnate; pinnæ 1½in. to 2in. long, ¼in. to ½in. broad, linear, entire or very slightly toothed towards the point, which is acute in the fertile, bluntly rounded in the barren frond. *sori* in a continuous line along both edges. Malayan Peninsula, &c. SYN. *Isoloma lanuginosum.*

L. linearis (linear). *rhiz.* wiry, creeping. *sti.* wiry, flexuose, black, shining, 4in. to 8in. long. *fronds* 6in. to 12in. long, ⅛in. broad, simply pinnate; pinnæ ¼in. long, two lines deep, upper edge very slightly toothed, the lower ones often with a considerable space between them. *sori* in a continuous line along the upper edge. Australia, New Zealand, &c., 1820. Greenhouse.

L. lobata (lobed). *rhiz.* short-creeping. *sti.* 6in. to 9in. long, firm, erect. *fronds* simple or with a long unbranched apex, and one to six pairs of erecto-patent branches, 3in. to 6in. long; pinnules about ¼in. long, ⅛in. broad, lower ones decurved principally at base, the outer margin rounded, upper three or four times lobed. *sori* marginal in the lobes. Neilgherries, Ceylon, Polynesian Islands, &c. SYNS. *L. obtusa, L. recurvata* (H. S. F. i. 70A), *Synaphlebium lobatum.*

L. Lobbiana (Lobb's). A synonym of *L. cultrata.*

L. media (intermediate). *sti.* 6in. to 12in. long, wiry, flexuose. *fronds* 6in. to 12in. long, deltoid in general outline, bi- or tripinnate; pinnæ 3in. to 4in. long, two to three lines deep, the lower line nearly straight, the upper one rounded. *sori* in a continuous marginal line. Tropical Australia, &c. Greenhouse. SYN. *Synaphlebium medium.*

L. microphylla (small-fronded). *rhiz.* creeping, fibrillose. *sti.* flexuose, wiry, 3in. to 6in. long. *fronds* 6in. to 18in. long, 2in. to 4in. broad, bi- or tripinnatifid; primary pinnæ distant, flexuose, 1in. to 4in. long; pinnules entire, or cut down to the rachis into several obversely triangular lobes, which, when fertile, are often not more than one line broad. *sori* in a continuous marginal line. New Zealand and temperate Australia. Greenhouse. SYN. *Isoloma microphyllum.*

L. oblongifolia (oblong-fronded). A synonym of *L. pectinata.*

L. obtusa (obtuse). A synonym of *L. lobata.*

L. parvula (small). *sti.* 6in. to 8in. long, naked, stramineous. *fronds* about the same length, bipinnate when fully developed, with a few distant spreading pinnæ, 2in. to 3in. long, ⅜in. broad; pinnules close, sub-rhomboidal, less than ¼in. broad, upper edge slightly curved. *sori* continuous. Trinidad.

L. pectinata (comb-like). *rhiz.* stout, wide-creeping, scandent. *sti.* erect, very short. *fronds* 1ft. to 1½ft. long, 1in. to 2in. broad, simply pinnate; pinnæ ¼in. to ⅜in. long, ⅛in. deep, the lower line nearly straight, the upper margin round, slightly crenate, point not very blunt, close together, but not imbricated. *sori* in an interrupted line along the upper edge. Malayan Peninsula. SYNS. *L. oblongifolia, Synaphlebium pectinatum.* (H. S. F. i. 61D.)

L. recurvata (recurved). A synonym of *L. lobata.*

FIG. 443. LINDSAYA RENIFORMIS.

L. reniformis (kidney-shaped).* *sti.* wiry, flexuose, 4in. to 6in. long. *fronds* sagittate-acuminate, with a deep basal sinus, 2in. to 4in. across, sometimes lobed. *sori* continuous along upper and outer edge. Guiana. A very rare species, resembling *Adiantum reniforme* and *Trichomanes reniforme.* SYN. *Isoloma reniforme.* See Fig. 443.

Lindsaya—*continued.*

L. rigida (rigid). *rhiz.* wide-creeping. *sti.* 4in. to 6in. long, rigid, erect, prickly towards the base. *fronds* with a long unbranched central point, and one to four pairs of flexuose lateral branches, 4in. to 8in. long; pinnules three to four lines broad, two lines deep, lower edge often falcate, upper three or four-lobed. *sori* in a marginal line on the lobes. Malayan Peninsula. This species resembles *L. stricta.* (H. S. F. i. 63A.)

L. sagittata (arrow-pointed). *sti.* wiry, flexuose, 4in. to 6in. long, black, polished. *fronds* sagittate-acuminate, with a deep basal sinus, 2in. to 4in. across, sometimes lobed. *sori* continuous. Guadeloupe and French Guiana.

L. stricta (upright).* *rhiz.* short-creeping, fibrillose. *sti.* rigid, erect, 1ft. to 2ft. long. *fronds* simply pinnate, 1ft. to 2ft. long, ¼in. broad, or with one or two pairs of erect, rigid, lateral branches; pinnules ¼in. broad, less deep, the lower line often considerably decurved, the upper rounded, nearly entire, closely placed. *sori* in a continuous line round the upper edge. Tropical America, 1839. A variable and pretty form. SYN. *L. elegans.*

L. tenera (tender). A form of *L. flabellulata.*

L. trapeziformis (diamond-shaped).* *rhiz.* short, creeping. *sti.* strong, erect, 6in. to 12in. long. *fronds* 6in. to 15in. long, with a long entire point and one to four pairs of rather rigidly erecto-patent branches, which are often 6in. to 12in. long; pinnæ ⅝in. to 1½in. long, ⅛in. to ¼in. deep, the lower line nearly straight, or curved upwards or downwards, the upper rounded, entire, closely packed, but scarcely imbricated. *sori* in a continuous line round the upper margin. Tropical Asia and America, &c., 1819. A beautiful species. SYN. *L. horizontalis.* (H. S. F. i. 62B.)

L. trichomanoides (Trichomanes-like). *rhiz.* creeping, fibrillose. *sti.* 4in. to 6in. long, slender, wiry. *fronds* 4in. to 9in. long, 2in. to 3in. broad, ovate-oblong, bipinnatifid; pinnæ 2in. to 3in. long, lanceolate, erecto-patent, cut down quite to the rachis below into cuneate pinnules, which are again broadly lobed on the upper edge. New Zealand, &c. A pretty greenhouse or Wardian case plant.

LINEÆ. Including *Erythroxyleæ.* A small order of herbs, shrubs, or rarely trees, glabrous or rarely hirsute or tomentose. Flowers regular, hermaphrodite, usually terminal, in racemes, panicles, corymbs, heads, fascicles, or spikes; petals often blue, yellow, or white, rarely pink, fugacious, or, in a few genera, persistent. Leaves alternate, or very rarely opposite, simple, entire. *Linum usitatissimum* yields the flax and linseed of commerce. There are fourteen genera, and 135 species. Illustrative genera are: *Erythroxylon, Ixonanthes, Linum.*

LINEAR. Narrow; when the two sides are nearly

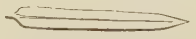


FIG. 444. LINEAR-ACUTE LEAF.

parallel. A Linear-acute leaf is shown in Fig. 444.

LING. *See* **Calluna** and **Trapanatans.**

LINGULATE. Tongue-shaped.

LINNÆA (so named by Gronovius, after the great Linnæus, at his own request). ORD. *Caprifoliaceæ.* A monotypic genus. The species is a very pretty, hardy, trailing, sub-shrubby, creeping evergreen, and forms broad leafy patches. It is a desirable plant for rock gardens, preferably in a rather shaded situation; and thrives best in a moist peaty soil. Linnæa will also grow luxuriantly in large pots, filled with peat soil. Propagated readily by divisions.

L. borealis (Northern).* *fl.* flesh-coloured, twin, pendulous, fragrant; peduncles axillary; corolla campanulate, tube cylindrical; calyx double. May and June. *l.* roundish or ovate, firm, slightly hairy. The cold regions of the Northern hemisphere (Britain). (Sy. En. B. 644.)

LINOSYRIS. *See* **Chrysocoma Linosyris.**

LINUM (from *Linon*, the old Greek name used by Theophrastus). Flax. ORD. *Lineæ.* A genus comprising about eighty species of glabrous or rarely pubescent, annual, biennial, or perennial herbs or shrubs, natives of all the temperate regions of the globe, but rare in the tropics. Flowers yellow, blue, or rarely rosy, blood-coloured or white, very fugitive, in terminal or axillary

Linum—*continued.*

racemes, sometimes loosely racemose-subcymæform, sometimes in contracted fascicles or spicate heads. Leaves alternate or rarely opposite, narrow, entire, one to many-nerved. Linums, whether of annual or perennial duration, are exceedingly ornamental and very free-flowering plants. The hardy perennial species are well suited for rockwork embellishment, and some of them succeed in the mixed border, where the soil is well drained. In all northerly parts of the country, a sheltered, warm position should be afforded, to insure their safety. Propagation may be effected by seeds, by cuttings, or sometimes by divisions in spring. Seeds are generally produced freely, and may be sown in pots, about March, and the young plants afterwards transferred to the open air; or they may be sown outside, in April. Cuttings should be taken in summer, when the wood is sufficiently firm without being too much hardened, and inserted in a shady position, under a hand glass. *L. grandiflorum*, one of the best showy annuals in cultivation, may be raised in any quantity from seeds sown, in March, where the plants are intended to flower. A well-drained sandy loam, with a little leaf mould or peat intermixed, may be recommended for Linums grown outside; but they are not usually fastidious regarding soil. All the undermentioned are hardy herbaceous perennials, except where otherwise stated.

L. alpinum (alpine).* *fl.* blue, large, few, rather corymbose; inner sepals blunt, outer ones acutish. July and August. *l.* linear, awl-shaped, spreading, full of pellucid dots. *h.* 6in. Europe, 1739. (S. B. F. G. 17.)

L. angustifolium (narrow-leaved). Pale Flax. *fl.*, petals pale purple, with a slight notch; sepals acutish. July. *l.* linear-lanceolate, acute. *h.* 1ft. Europe (Britain). Plant glabrous, many-stemmed, rather erect. (Sy. En. B. 291.)

FIG. 445. LINUM GRANDIFLORUM, showing Habit and detached Portion of Inflorescence.

L. arboreum (tree-like).* *fl.* yellow, handsome, large, few, somewhat capitate; sepals acuminated. May and June. *l.* cuneiform, obtuse, alternate, recurved. *h.* 1ft. Crete, &c., 1788. A handsome dwarf spreading shrub, rather tender, but it will thrive in a warm sunny spot in the open border; it should be sheltered by a few branches during severe winters. (B. M. 234.)

L. austriacum (Austrian). *fl.* pale bluish-purple; petals retuse; fructiferous pedicels deflexed. June and July. *l.* linear or rather lanceolate, acute, erectish, full of pellucid dots. Branches racemose. *h.* 1ft. to 2ft. Austria, 1775. Plant glabrous, erect. (B. M. 1806.)

L. campanulatum (bell-shape-flowered). *fl.* yellow, corymbose. June to August. *l.* alternate; lower ones rounded at the apex; middle ones furnished with a small point; upper ones obversely lanceolate, acuminate. *h.* 1ft. South Europe, 1795. Plant scabrous at the base, glaucous. (L. B. C. 1254.)

L. Chamissonis (Chamisso's). A synonym of *L. Macraei.*

L. flavum (yellow).* *fl.* transparent golden-yellow, densely and numerously produced in branched heads; sepals acuminated, serrulated. June to August. *l.* alternate, narrow-lanceolate, acute, sessile, with smooth margins. *h.* 1ft. to 1½ft. Europe,

Linum—*continued.*

1793. A very handsome plant, woody at the base; it is not quite hardy in the Northern parts of England, but will withstand severe weather if slightly protected. (B. M. 312.)

L. grandiflorum (large-flowered).* *fl.* rose-coloured, large, loosely panicled; sepals lanceolate, acute, ciliately serrated. June and July. *l.* linear-lanceolate, acute, erectish. *h.* 6in. to 12in. North Africa, 1820. Hardy annual. Plant glabrous, erectish, branched at the base. See Fig. 445. (B. M. 4956.) The form known as *rubrum* has brighter-coloured flowers than the type.

L. Macraei (MacRae's).* *fl.* orange; sepals ovate, acuminated. Summer. *l.* opposite or alternate, lanceolate, acuminated, stiff. Stems shrubby at the base. *h.* 1ft. Chili, 1864. Greenhouse or half-hardy. SYN. *L. Chamissonis.* (B. M. 5474.)

L. monogynum (one-styled). *fl.* yellow, numerous; sepals ovate-lanceolate acute. June and July. *l.* alternate, lanceolate. Stem shrubby. *h.* 1ft. New Zealand, 1822. (B. M. 3574.)

L. narbonense (Narbonne).* *fl.* of a beautiful blue, but sometimes white, large, disposed in sub-corymbose panicles. May to July. *l.* alternate, distant, lanceolate-linear, very acute, and rather stiff. *h.* 2ft. Europe, 1759. Plant glabrous, erect, rather glaucous. (L. B. C. 190.)

L. nervosum (nerved). *fl.* blue, large, in loose panicles; petals emarginated or pointed, crenated at the apex. June and July. *l.* lanceolate, pointed, glabrous. Stem hairy at the base. *h.* 1ft. to 1½ft. Eastern Europe, 1822.

L. perenne (perennial). *fl.* pale blue; petals emarginate; outer sepals hardly mucronate, inner ones blunt. June and July. *l.* linear, acute, erect. *h.* 1ft. to 1½ft. Europe (Britain). Plant glabrous, ascending. (Sy. En. B. 290.)

L. salsoloides (Salsola-like). *fl.* white, with a purple centre or eye; sepals ovate, acuminated, fringed with glandular hairs in the middle. June and July. *l.* linear-setaceous, smoothish. Stems shrubby at the base, branched, and a little twisted; branches ascending. *h.* 1ft. South-west Europe, 1810. Hardy evergreen.

L. sibiricum (Siberian). *fl.* of a beautiful blue, large; sepals oval, outer ones acutish, inner ones very blunt. *h.* 3ft. to 4ft. Siberia, 1775. Plant glabrous, erect. (B. R. 1163.)

L. tauricum (Taurian).* *fl.* yellow, in dichotomous panicles; sepals acuminated, serrulated. June to August. *l.* alternate, glaucous; lower ones rather spathulate, upper ones lanceolate. *h.* 1½ft. Caucasus, 1818. Hardy evergreen shrub.

L. trigynum. *See* **Reinwardtia trigyna.**

FIG. 446. FLOWERING STEM OF LINUM USITATISSIMUM.

L. usitatissimum (most-used). Common Flax. *fl.* blue, in corymbose panicles; petals rather crenated; sepals ovate, acute. June and July. *l.* lanceolate or linear, acute. *h.* 1½ft. Europe. Plant erect, glabrous. Hardy annual. See Fig. 446. (Sy. En. B. 292.)

L. viscosum (clammy). *fl.* pale purple, rarely blue, in an erect corymb. June to August. *l.* lanceolate, alternate and somewhat opposite, and, as well as the stems, hairy. *h.* 1ft. to 2ft. Europe, 1807.

LION'S EAR. *See* **Leonotis.**

LION'S FOOT. *See* **Leontopodium.**

LION'S TAIL. *See* **Leonotis Leonurus.**

LIPARIA (from *liparos*, oily, shining; in allusion to the shining surface of the leaves). ORD. *Leguminosæ*. A genus comprising about four species of greenhouse shrubs, confined to the Cape of Good Hope. Flowers yellow, in terminal heads; bracts large, imbricate, involucrate; standard oval-oblong; wings oblong; keel narrow, acute. Leaves simple, entire, coriaceous. *L. parva* and *L. sphærica* are the two species introduced. They thrive in a compost of fibry loam and turfy peat, with a small quantity of sand added. Propagated by cuttings of young shoots, inserted in sand, under a bell glass. Water must at all times be given with great care.

L. parva (small). *fl.* yellow, small, capitate; bracts orbicular, acuminate, with bearded edges; segments of calyx lanceolate-elliptic, bearded. March and April. *l.* ovate-elliptic, acuminate, three to five-nerved, spreading or reflexed. 1840.

L. p. angustifolia (narrow-leaved).* This is a variety having narrower leaves than the type. 1840. (B. M. 4034.)

L. sphærica (spherical). *fl.* orange, in dense nodding heads, fully 3in. or 4in. in diameter. July and August. *l.* lanceolate-oblong, pungent, three to seven-nerved, smooth. *h.* 4ft. 1794. (B. M. 1241.)

LIPARIS (from *liparos*, smooth, oily; referring to the leaves). SYNS. *Alipsa*, *Sturmia*. Including *Empusa* and *Platystylis*. ORD. *Orchideæ*. A genus comprising about 100 species of stove or hardy, small-flowered, terrestrial and epiphytal orchids, broadly dispersed through the temperate and warm regions of the globe. Flowers usually dull white, green, or yellow, small, racemose; column rather long, semicircular or two-winged in the upper part, but not branched. Leaves few, sometimes solitary at the base, or below the middle of the stem, on sheathing petioles, often at length contracted at the joint, membranaceous or slightly fleshy, equally many-nerved or sparingly ribbed. Very few species are worth growing for ornament. The hardy sorts thrive in a moist, shady situation, and do best when planted very shallow, and covered with moss. The stove kinds require a compost of fibry peat, sphagnum, charcoal, and very small pieces of crocks, and are most suitably grown in shallow, open baskets. Except where otherwise indicated, the undermentioned species require stove treatment.

L. atropurpurea (dark purple). *fl.* dark purple; lip oblong, obtuse, recurved, crenulate; lateral sepals oblong-lanceolate, oblique; petals very long, filiform; raceme erect, few-flowered; scape terete. June. *l.* two or three, nearly round, acuminate, petiolate, folded, obliquely cucullate at base. Ceylon, 1865. A very pretty species. (B. M. 5529.)

L. decursiva (decurrent). *fl.* green, darker on each side of the whitish mid-line of the lip; peduncle narrowly winged. *l.* cuneate-oblong, with decurrent bases. Pseudo-bulbs thick. India, 1884.

L. elata (tall). *fl.*, lip purple, obovate, retuse, bicallose at base: sepals herbaceous, lateral ones recurved; racemes erect, many-flowered; scape angular. *l.* many, oblong, acute, folded, shorter than the racemes. East Indies and Brazil. (B. R. 1175.)

L. foliosa (leafy). *fl.* yellowish-green; lip oblong, obtuse, recurved; sepals and petals reflexed, equal. September. *l.* several, oblong-lanceolate, acute. Mauritius, 1823. (B. M. 2709; B. R. 882; L. B. C. 1097.)

L. formosana (Formosan). *fl.* light purple, with green borders; lip sagittate, acute. March. *l.* oblong, acute, plaited. Formosa, 1880.

L. lilifolia (Lily-leaved).* *fl.* brownish-purple, with a leaflike lip. July. *l.* ovate. North America. Hardy. (B. M. 2004, under name of *Malaxis lilifolia*.)

L. Lœseli (Lœsel's). *fl.* pale yellow; lip obovate, entire, recurved; spikes few-flowered. July. *l.* two, narrow-elliptical; stalk three-cornered. North America and Europe (Fens of East England). Hardy. (Sy. En. B. 1488.)

L. pendula (pendulous). *fl.* whitish-green, small, disposed in slender, pendulous racemes, 1ft. long, giving the plant an elegant appearance. India.

LIPARIS. A genus of moths, belonging to a family of which the larvæ are at times very destructive to cultivated trees (*see* **Hawthorn Caterpillars**). The larvæ of all the species are hairy, and often bear peculiar

Liparis—*continued.*

tufts of hair on certain parts of the body, and they are usually bright-coloured.

FIG. 447. CATERPILLAR OF LIPARIS AURIFLUA (GOLD-TAIL MOTH).

L. auriflua (Gold-tail Moth) is satiny-white, with one or more rounded black spots on the upper wings,

FIG. 448. LIPARIS CHRYSORRHÆA (BROWN-TAIL MOTH).

and a tuft of golden-yellow down at the tip of the body. The larva (see Fig. 447) bears three rows of

FIG. 449. CATERPILLAR OF LIPARIS CHRYSORRHÆA.

tubercles along the body; those nearest the back are black, those in the middle bear each a tuft of whitish

Liparis—*continued.*

hairs, those below are coral-red; the fifth and sixth segments are humped above. It feeds chiefly on Hawthorn, and is very common in England.

L. chrysorrhœa (Brown-tail Moth) is pure white (see Fig. 448), with a large tuft of brown hairs at the tip of the abdomen, used for covering over the eggs when laid. The larva is black, with warty tubercles, emitting tufts of snow-white hairs, on the second and on the fifth to twelfth segments, and on the tenth and eleventh segments are scarlet cup-shaped spots in the middle of the back (see Fig. 449). It feeds on fruit-trees, Hawthorn, Oak, &c.

L. dispar (Gipsy Moth). In this species, the males (see

FIG. 450. LIPARIS DISPAR (MALE).

Fig. 450) are dark brown, the upper wings with zigzag darker markings, and a central spot. The females (see

FIG. 451. LIPARIS DISPAR (FEMALE).

Fig. 451) are much larger and heavier, with dingy white wings barred with darker belts. The larva is black,

FIG. 452. CATERPILLAR OF LIPARIS SALICIS (SATIN MOTH).

netted with grey; there is a grey median dorsal line, and each segment bears two dark blood-coloured dorsal tubercles, and four grey ones on the sides. It feeds on Hawthorn, Blackthorn, Plums, Apples, &c., and in France often does much damage.

Liparis—*continued.*

L. monacha (Black Arches), like the last, shows a marked inequality in size of male and of female, and, like it, is often most hurtful to trees on the Continent—Oak, Birch, &c., but more especially to conifers, from which it often strips the leaves. The species is rare in Britain.

L. salicis (Satin Moth). The wings of this moth are satiny-white; the body is black, but covered with long white hairs. The larva (see Fig. 452) bears a row of white spots down the middle of the back, bordered on each side by a broad black stripe, in which lie eleven red tubercles; sides grey, with red tubercles. The larvæ usually feed on Poplars and Willows, but, at times, also on other trees.

Hand-picking and beating appear to be the best methods to limit the numbers of all the species.

LIPOSTOMA. A synonym of *Coccocypselum.*

LIPPIA (named in honour of Augustus Lippi, a French physician and traveller in Abyssinia). Including *Aloysia* and *Zapania.* ORD. *Verbenaceæ.* A large genus (almost ninety species) of stove or greenhouse, glabrous, pilose, tomentose, pubescent, or hirsute, shrubs or sub-shrubs, rarely herbs, mostly American, a few being found in Africa, and two broadly dispersed over the warmer regions of the globe. Flowers small, solitary, sessile, in the axils of the bracts. Leaves opposite or ternately whorled, rarely alternate, entire, toothed, or lobed, flat or rugose. But few of the species are in cultivation. They require a rich light soil. Cuttings of the young shoots will root readily in sandy soil, in any close, warm frame.

L. citriodora (Citron-scented).* Lemon Plant; Scented Verbena. *fl.* nearly white, small, forming an unbranched panicle. Summer and autumn. *l.* in whorls of three; veins on each side of the midrib running parallel to each other. *h.* 3ft. Chili, 1794. Greenhouse (hardy in the South of England). The leaves of this species emit a delightful fragrance when bruised. SYNS. *Aloysia citriodora, Verbena triphylla* (B. M. 367).

L. nodiflora (node-flowered). *fl.* white or purple; heads dense, globose, on axillary peduncles. May to September. *l.* obovate, oblong, or lanceolate, rough, tapering and entire below the middle, serrate above, 1in. long. *h.* 6in. to 12in. North America. Half-hardy. SYN. *Zapania nodiflora.*

L. reptans (creeping). *fl.* white, red; heads ovoid-globose, at length oblong. June. *l.* spathulate, serrate above, penninerved, 1in. to 1½in. long. *h.* 1ft. South America, 1847. Greenhouse.

LIQUIDAMBAR (from *liquidus*, liquid, and *ambar*, amber; referring to the gum, called liquid storax, produced by this genus). ORD. *Hamamelideæ.* A genus of about four species of ornamental, balsam-bearing, deciduous trees, natives of the Levant, North America, and China, with catkins of monœcious flowers, which are surrounded by a four-leaved, deciduous involucre; male catkins conical or sub-globular; females sub-globular, surrounded by scales. Leaves alternate, slender, petiolate, stipuled. The species principally grown is *L. styraciflua*, the leaves of which, according to Loudon, are very fragrant at all seasons, "but in spring, when they are unfolding, after a warm shower, the surrounding air is filled with their refreshing odour." Liquidambars thrive best in a moist loamy soil, and in a sheltered situation. Propagated freely by layers, which may be taken off at the end of the first autumn after they have been formed. Imported seeds (of the two species described below), allowed to remain in the catkins until the time of sowing, will be quite a year germinating. The seedlings usually attain a height of from 6in. to 8in., and may be transplanted out that year or the next.

L. imberbe (beardless). *l.* palmate, usually five-lobed, with the sinuses at the base of the veins, smooth. *h.* 10ft. to 20ft. Levant, 1759. A large bush, of slow growth, with numerous small branches crowded together into an irregular head. It has a more shrubby habit than *L. styraciflua.* SYN. *L. orientalis.*

L. orientalis (Eastern). A synonym of *L. imberbe.*

L. styraciflua (storax-flowing).* Sweet Gum. *fl.* greenish-yellow. Spring. *l.* palmately lobed, with the sinuses at the base

Liquidambar—*continued.*

FIG. 453. BRANCH OF LIQUIDAMBAR STYRACIFLUA, bearing (1) Female and (2) Male Flowers.

of the veins, villous. *h.* 30ft. to 50ft. North America, 1681. An elegant tree, somewhat resembling the Maple, but having alternate leaves, which change towards the autumn to a bright red, and remain on the tree until the first frosts. See Figs. 453 and 454.

FIG. 454. FEMALE FLOWERING BRANCH OF LIQUIDAMBAR STYRACIFLUA.

In addition to the two species above described, there are two or more species recently discovered in China—one or more being the trees which furnish the wood used by the Chinese to make the chests in which they export their tea.

LIQUID MANURE. *See* **Manures.**

LIQUORICE. *See* **Glycyrrhiza.**

LIRIODENDRON (from *Leirion*, a Lily, and *dendron*, a tree). Tulip-tree. ORD. *Magnoliaceæ*. A monotypic genus, the species being an elegant, hardy, deciduous tree. It thrives best in a good deep loamy soil; and a sheltered, but not overshadowed, situation is most suitable. Propagated by seeds, which should be sown in a rather moist sandy loam, in a shady position, during autumn.

L. tulipifera (tulip-bearing).* *fl.* variegated with green, yellow, and orange, large, solitary, terminal, very fragrant, each blossom furnished underneath with two deciduous bracts; petals six, connivent in two imbricated series; sepals three, reflexed; carpels, in an oblong spike, two-seeded, at length samaroid and indehiscent. Summer. *l.* smooth, simple, alternate, stipulate, three-lobed; the terminal lobe emarginately truncate, the lateral ones with two sinuses. *h.* 75ft. to 100ft. North America, 1688. A splendid tree, resembling an erect-growing Plane in habit. See Fig. 455.

Liriodendron—*continued.*

FIG. 455. LIRIODENDRON TULIPIFERA, showing Flowering Branchlet, and Longitudinal Section of Flower, with Sepals and Petals removed.

LIRIOPE (named after the nymph Liriope). ORD. *Hæmodoraceæ*. A monotypic genus. The species is a pretty cool greenhouse plant, with a short, thick, sometimes stoloniferous rhizome. For culture, *see* **Ophiopogon** (under which this genus was formerly included).

L. graminifolia (grass-leaved). *fl.* rather small, in fascicles or clusters of three to five, on a spicate raceme 6in. to 12in. long; perianth deep violet-blue, sub-campanulate, deeply divided into six segments; scape erect, dark livid-purple. October. *l.* all radical, 6in. to 12in. long, linear-lanceolate, obtuse, three-nerved, obscurely striated, surrounded by a few membranous scales at the base. China and Japan, 1821. SYN. *Ophiopogon spicatus* (under which name it is figured in B. M. 5348, B. R. 593, and L. B. C. 694).

LISIANTHUS (said to be derived from *lysis*, dissolution, and *anthos*, a flower; a name given to the plant on account of the medicinal virtues it possesses of dissolving humours, being a powerful cathartic). Sometimes spelt *Lisyanthus*. ORD. *Gentianeæ*. A genus comprising about fifty species of greenhouse or half-hardy herbs or shrubs, natives of tropical America. Flowers blue, purple, white, or yellowish-green, showy, erect or nodding, in terminal cymes; corolla funnel-shaped; tube shortly cylindrical at base; limb oblique, or equally five-lobed, often shorter than the tube, obtuse or acute, twisted. Capsules nodding, or rarely erect. Leaves opposite, sessile or petiolate, narrow, rather fleshy-coriaceous, rarely broad, membranaceous. The species of *Lisianthus*, and also those of *Eustoma*, which are more frequently referred to as belonging to the same genus, are amongst the most difficult of plants to cultivate successfully. They are very handsome when in flower, and, consequently, well repay for the devotion of a little more than ordinary attention, with a view to bringing them to perfection. Some of the species are only of annual duration, and may be increased by seeds; others, of a shrubby habit, may be propagated from cuttings. *Eustoma Russellianum*, the plant generally known and grown in gardens as *Lisianthus Russellianus*, is more frequently seen than any of the species of the latter genus. If not a biennial, it should be treated as such, by preparing plants one season to flower the next. The seeds are very minute, and should be sown, in spring, on the surface of some light soil,

Lisianthus —*continued.*

merely covering by laying a pane of glass over the pot, and keeping it shaded in a situation where there is a little bottom heat, until germination takes place. When large enough to handle without injury, the young plants may be placed singly in small pots, using, at this and subsequent times, a compost of loam, leaf mould, and peat, in about equal quantities, with an addition of some charcoal, or sharp sand. A bed where there is a slight bottom heat from fermenting material, is the best place for the plants throughout the summer. They should be wintered in a warm greenhouse, choosing a light position, and watering very carefully. Early the following spring, they should be returned to a little bottom heat, and, when started into growth, be placed in 8in. pots for flowering. Mildew often proves very destructive, and must be guarded against. *L. princeps* is a very distinct and fine plant, rarely seen in cultivation.

L. acutangulus (acute-angled). *fl.* green, yellow, pendulous; peduncles dichotomous, panicled. January to May. *l.* connivent at the base; lower ones cordate, upper ones ovate. Stem fistular, acutely tetragonal. *h.* 3ft. St. Martha, 1845. Annual. (B. M. 4324.)

L. exaltatus (exalted). A synonym of *Eustoma exaltatum.*

L. Œrstedii (Œrsted's). *fl.* greenish-yellow, whitish at the edge, unilateral, nodding, disposed in terminal racemose panicles; corolla infundibuliform, oblique *l.* opposite, elliptic or obovate-oval. Nicaragua, 1871. Evergreen.

L. princeps (chief).* *fl.* rich scarlet, melting into yellow at either end, with an emerald-green five-lobed limb, about 3in. long; disposed in clusters of four at the ends of the drooping twigs. *l.* ovate, acuminate, deep green, opposite. New Grenada. Evergreen.

L. pulcher (fair).* *fl.* scarlet, pendulous; panicles terminal, trichotomous; stamens exserted. August. *l.* petiolate, elliptic-lanceolate. Branches bluntly tetragonal. *h.* 5ft. New Grenada, 1847. Evergreen. (B. M. 4424.)

L. Russellianus (Duke of Bedford's). A synonym of *Eustoma Russellianum.*

LISSANTHE (from *lissos*, smooth, and *anthos*, a flower; in reference to the limb of the corolla being destitute of hairs). ORD. *Epacrideæ.* A genus of three species of pretty, greenhouse, evergreen, erect shrubs, inhabiting Western Australia and Tasmania, allied to *Leucopogon.* Flowers white or pink, small, in terminal or axillary spikes or racemes; corolla funnel-shaped; limb beardless. Leaves scattered, narrow, obtuse or pungent, often hoary underneath, striate-nerved. The species here described is probably the only one yet introduced. For culture, *see* **Epacris.**

L. sapida (savoury). *fl.* white, tipped with green; racemes two or three-flowered, recurved. June. *fr.*, berries red, acid, edible. *l.* oblong-linear, mucronate, with revolute margins, whitened, and striated beneath. *h.* 4ft. New South Wales, 1823. (B. M. 3147; B. R. 1275.)

LISSOCHILUS (from *lissos*, smooth, and *cheilos*, a lip; in reference to the labellum). SYN. *Hypodematium.* ORD. *Orchideæ.* A genus comprising about thirty species of usually stove terrestrial orchids, natives of tropical and Southern Africa. They are distinguished from *Eulophia* in the great disparity between sepals and petals. Flowers often showy, pedicellate, in simple racemes; sepals free, equal, spreading; petals broader or larger than the sepals; lip affixed to the base of the short, semi-terete, erect column; scapes at the sides of the pseudo-bulbs or rhizomatose, leafless, many-sheathed. Leaves long, often narrow, prominently veined or plicate. The stove species require a fibrous loamy soil, with good drainage; and a liberal supply of water will be needed when growing. A decided season of rest is necessary after all growth has ceased, when water may, for some time, be entirely withheld. The undermentioned are the species best known to cultivation.

L. Horsfallii (Horsfall's).* *fl.*, sepals rich brown; petals large, white, with a delicate shade of rose; lip green and rich purple; spike several-flowered. *l.* plicate, sharp-pointed, 2ft. to 3ft. long by 4in. to 6in. broad. Old Calabar, 1865. A very handsome plant. (B. M. 5486.)

Lissochilus—*continued.*

L. Krebsii (Krebs').* *fl.* scattered, 1¼in. in diameter; sepals green, with dull purple blotches, broadly linear-oblong; petals pale golden-yellow, three to four times as large as the sepals; lip pendulous, sessile, brownish inside; racemes 1ft. to 1½ft. long, twenty to thirty-flowered; scape 2ft. to 3ft. high, stout. *l.* in copious tufts from base of pseudo-bulb, 8in. to 12in. long, 2in. to 3in. broad. Pseudo-bulbs 2in. to 3in. long, ovoid or elliptic-oblong. Natal, 1867. (B. M. 5861.)

L. speciosus (showy). *fl.* yellow, butterfly-like, produced in large and beautiful spikes. June. Cape of Good Hope, 1818. A handsome, free-flowering, greenhouse species. (B. R. 573.)

L. streptopetala (twisted-petaled). *fl.* yellow; sepals oblong-obtuse; petals twice the size of the sepals, twisted at the base; middle lobe of lip roundish, emarginate; spur short, conical. March. *l.* linear-lanceolate, acute, three-nerved, sheathing at the base. Brazil, 1822. SYN. *Eulophia streptopetala* (B. M. 2931; B. R. 1002).

LISTROSTACHYS ARCUATA. *See* **Angræcum arcuatum.**

LISYANTHUS. *See* **Lisianthus.**

LITANTHUS (from *litos*, small, and *anthos*, a flower; because of the extremely small size of the plant). ORD. *Liliaceæ.* A monotypic genus. The species is an exceedingly small, greenhouse, bulbous plant, having a bulb about the size of a pea. For culture, *see* **Scilla.**

L. pusillus (very small). *fl.* white, solitary, small, drooping; perianth tubular, cylindrical, six-cleft. August. *l.* succeeding the flowers. *h.* 2in. South Africa. 1870. This forms a pretty object when grown in clumps in a pot. (B. M. 5995.)

LITHOSPERMUM (the old Greek name used by Dioscorides, and derived from *lithos*, a stone, and *sperma*, a seed; in allusion to the hard, stone-like seeds). Gromwell. Including *Batschia.* ORD. *Borragineæ.* A considerable genus (forty species have been described) of usually hardy biennial or perennial herbs, sub-shrubs, or rarely small shrubs, widely spread over Europe and Northern Asia, although most of the species belong to the Mediterranean region. Flowers white, yellow, blue, or violet, disposed in bracteated cymes; corolla regular, funnel-shaped or salver-shaped, without scales at the throat. Nut not contracted at the base, having a flat surface of adhesion to the receptacle. Leaves alternate, usually narrow. Only a few species of this genus are worthy of culture, and these form exceedingly pretty plants for borders, rockwork, and such-like places. They thrive best in a sandy soil or a rich loam, either of which must be well drained. Propagated by cuttings, by divisions, or by seeds.

L. canescens (hoary). *fl.* yellow, fulvous, nearly sessile; tube of corolla twice as long as the calyx. June and July. *l.* oblong, obtuse, emarginate at the apex. Stem erect, divided into two leafy cymes at top. North America, 1826. Herbaceous perennial. SYN. *Batschia canescens.* (B. M. 4389.)

L. fruticosum (shrubby). A synonym of *L. prostratum.*

L. Gastoni (Gaston's).* *fl.* bright sky-blue, twice as large as those of *L. prostratum*, and disposed in terminal clusters. Summer. *l.* obovate-lanceolate, slightly rough with adpressed hairs. *h.* 1ft. to 1½ft. Western Pyrenees. A rare and very desirable herbaceous perennial. (B. M. 5926.)

L. hirtum (hairy). *fl.* yellow, pilose outside; tube of corolla shorter than the calyx. May to July. *l.* linear-lanceolate, obtuse, 2in. to 3in. long. *h.* 6in. South United States, 1812. Perennial. SYN. *Batschia Gmelini.*

L. petræum (rock). A synonym of *Moltkia petræa.*

L. prostratum (prostrate) * *fl.* deep blue, striped with reddish-violet, axillary, distant, sessile, disposed in terminal leafy spikes on the older branches; tube of corolla three times longer than the calyx. Summer. *l.* sessile, lanceolate-linear, hispid. South-western Europe, 1825. A very handsome dwarf, trailing, evergreen sub-shrub, with prostrate spreading stems. From its bright blue, Gentian-like flowers, it is sometimes called the Gentian Lithospermum. The form of growth assumed by this plant eminently fits it for rockwork. It can be increased only by cuttings, which must be struck from the previous year's growth, inserted in fine sand and peat, and kept shaded and cool for a few weeks. SYN. *L. fruticosum.*

L. purpureo-cæruleum (purplish-blue).* *fl.* at first red, afterwards purple, more than ½in. in diameter, axillary and at the sides of the leaves, disposed in terminal, short, twin racemes. Early summer. *l.* rough, lanceolate, acute, attenuated at the base, with revolute margins, 1½in. long. *h.* 1ft. Europe (Britain). A pretty perennial species, with creeping barren and erect flowering stems. (Sy. En. B. 1100.)

LITHRÆA. *See* **Rhus.**

LITOBROCHIA. *See* **Pteris.**

LITSEA (from the Japanese name). SYN. *Tetranthera.* Including *Tetradenia.* ORD. *Laurineæ.* A large genus (upwards of 140 species have been described) of greenhouse or half-hardy trees, rarely shrubs, natives of tropical and Eastern Asia, from the Malayan Archipelago to Japan, tropical and sub-tropical Australia, New Zealand and New Caledonia, and (a few) North America. Flowers dicœcious, umbellate or capitate; involucres globose, pedicellate or sessile, disposed in sessile or shortly pedunculate fascicles, or in axillary or lateral racemes. Leaves alternate, few, or rarely almost opposite, penniveined or triplinerved. Few of the species are grown in this country. For culture, *see* **Laurus.**

L. geniculata (jointed). *fl.* yellow, polygamous, disposed in terminal, few-flowered umbels; pedicels short. May. *l.* deciduous, lanceolate, glabrous. Branches deep red, divaricately flexuous. *h.* 6ft. South United States, 1759. Half-hardy. SYN. *Laurus geniculata* (under which name it is figured in B. M. 1471).

L. glauca (glaucous). *fl.* whitish, as large as a hazel-nut, in dense branched clusters. Summer. *l.* lanceolate-oblong, acuminate, green above, silvery beneath. Japan. A handsome bush for cool conservatory decoration.

L. japonica (Japanese). *fl.* white; umbels fasciculated, shortly peduncled; involucre five to nine-flowered. *l.* rigid, coriaceous, oblong or oblong-lanceolate, glabrous or shining above, ferruginous or tomentose beneath. *h.* 3ft. Japan, 1843. Half-hardy. (S. Z. F. J. 87, 100.)

LITTÆA. This is now included, by Bentham and Hooker, as a section of *Agave.*

LITTONIA (named after Dr. S. Litton, once Professor of Botany at Dublin). ORD. *Liliaceæ.* A genus comprising only two species, one a native of Natal, and the other of Angola. Flowers orange, showy, nodding; pedicels short, solitary, axillary, ebracteate. Lower leaves ternate or quinate, sub-verticillate; upper ones sub-opposite or scattered, lanceolate, acuminate. Stems flexuous, simple, leafy. *L. modesta*—the only species yet introduced—is an elegant stove or greenhouse plant, very like *Gloriosa* in habit and general appearance. For culture, *see* **Gloriosa.**

FIG. 456. LITTONIA MODESTA, showing Top of Flowering Shoot and detached Flower.

L. modesta (modest).* *fl.* rich orange, bell-shaped, axillary. Early summer. *l.* bright shining green, terminated by a tendril. *h.* 2ft. to 6ft. South Africa, 1853. A pretty plant for growing against a pillar. See Fig. 456. (B. M. 4723.)

LITTORAL. Growing on the sea-shore.

LITUATE. Forked, with the points a little turned outwards.

LIVISTONA (named in honour of P. Murray, once of Livingston, near Edinburgh). SYN. *Saribus.* ORD. *Palmæ.* A genus comprising fourteen species of very ornamental mostly stove palms, with unarmed stems, natives of Eastern tropical Asia, the Malayan Archipelago, New Guinea, and Eastern Australia. Flower-spikes branching, with several incomplete, leathery spathes. Leaves terminal, fan-shaped, divided into numerous segments, which are split at the apex, and frequently have threads hanging between them; footstalks sheathed at the base in a mass of netted fibres. The species thrive in a compost of two parts loam and one of peat, to which a little sand may be added. A liberal supply of water is needed throughout the summer. Several species are admirably adapted for various decorative purposes, and especially for sub-tropical gardening. Propagated by seeds, which should be sown in sandy soil, and placed in a gentle bottom heat.

Livistona—*continued.*

L. altissima (very tall). *l.* bright shining green, fan-shaped, 1½ft. to 2ft. from top of petiole to margin, divided into segments about one-third of the way down, each segment bifid at the apex; petiole 2ft. to 6ft. long, the upper part green, base brown, inclosed in a reddish-brown network of woody fibres, and armed on each edge with stout and sharp recurved black spines. Java, 1868.

FIG. 457. LIVISTONA AUSTRALIS.

L. australis (Southern).* *l.* dark green, nearly circular, much plaited, divided round the edge into narrow plicate segments; petioles stout, dark brown, inclosed in a network of fibrous matter at the base, and armed at the edges with stout spines. *h.* 80ft. Eastern Australia, 1824. SYN. *Corypha australis.* See Fig. 457. (B. M. 6274.)

L. chinensis (Chinese).* *l.* large, over 5ft. broad, fan-shaped, with pendent marginal segments; petioles 4ft. to 5ft. long, rounded below, flat above; edges armed with short reflex spines, enveloped at the base in a network of brown fibrous tissue. *h.* 50ft. South China, 1818. A well-known and very handsome

Livistona—*continued.*

species, proving quite hardy in Cornwall, and nearly so in many less Southern districts. SYNS. *L. mauritiana* and *Latania borbonica*. See Fig. 458.

FIG. 458. LIVISTONA CHINENSIS.

L. Hoogendorpii (Hoogendorp's). *l.* rich dark green, forming a complete circle, much plaited, deeply divided; petioles stout, blackish-brown, inclosed in a network of reddish-brown fibres, and armed at the edges with long, stout, and sharp spines. Indian Archipelago, 1874. See Fig. 459.

FIG. 459. LIVISTONA HOOGENDORPII.

L. humilis (humble).* *l.* dark green, large, orbicular-cordate, spreading, deeply divided into narrow plicate segments, tapering to a fine point; petioles clothed at their edges with close-set spines. *h.* 6ft. to 30ft. Tropical Australia, 1824. A handsome species for decorative purposes, when young.

L. inermis (unarmed). A little-known plant, differing from *L. humilis* principally in having the petioles entirely without prickles. North Australia.

L. Jenkinsiana (Jenkins').* *l.* rich dark green, fan-shaped, 2ft. to 4ft. across, plaited; margin divided into somewhat broad segments; petioles from 2ft. to 10ft. in length, somewhat keeled below, flat above, armed at the edges with very stout, sharp spines, which are slightly recurved. *h.* 10ft. Assam and Sikkim, 1845. A beautiful greenhouse plant.

L. mauritiana (Mauritian). A synonym of *L. chinensis*.

L. olivæformis (Olive-formed). *l.* dark green, rather reniform than flabellate, 2ft. to 3ft. from top of petiole to the margin, divided into pendulous segments for about one-third of the length; petioles 2ft. to 4ft. long, stout, brown at the base, inclosed in a tissue of dark brown netted fibres, armed with a few small reddish spines. Java.

L. rotundifolia (round-leaved). *l.* dark green, with a suborbicular blade 3ft. to 5ft. in diameter, palmato-multifid, the elongate segments with bifid tips; petioles 6ft. to 7ft. long, margined with sharp spiny teeth. Stem 40ft. to 50ft. high. Malay Islands, &c. Pretty, in a young state, for stove decoration. See Fig. 460.

LLAVEA (named in honour of M. la Llave, the discoverer of the species). ORD. *Filices*. A monotypic genus, the species being a stove fern. It requires a compost of peat and sand, and plenty of drainage. *See also* **Ferns.**

L. cordifolia (cordate-leaved). *sti.* 1ft. long, strong, erect, fibrillose towards the base. *fronds* 1ft. to 2ft. long, 6in. to 12in. broad, tripinnate; the lower sterile, with stalked ovate segments, 1¼in. to 2in. long, ½in. to ⅔in. broad; the fertile segments of the upper part pod-like, 1½in. to 3in. long. *sori* linear, occupying the whole length of the changed pod-like segments of the upper part of the frond; involucre the same shape, rolled over, and quite concealing the sori. Mexico, 1853. SYN. *Ceratodactylis osmundioides*.

LLOYDIA (named after Mr. Edward Lloyd, who first discovered the plant in North Wales). SYNS. *Nectarobothrium, Rhabdocrinum*. ORD. *Liliaceæ*. A small genus (two species) of bulbous plants, one of which inhabits the mountains of Europe (Britain), Central and Northern Asia, and North America, and the other is limited to the Himalayas. Flowers white or yellow, pedicellate. Radical leaves one to three; cauline ones few, small. Stem low, slender, bearing one or two flowers at the apex. Bulb narrow. *L. serotina*—probably the only species known to cultivation—is a rare and pretty, bulbous-rooted, hardy perennial, requiring a dry, sandy loam. Propagated by offsets, or by the creeping shoots with a bulb at the extremity.

L. serotina (late-flowering). *fl.* white, erect, solitary, veined externally with green; perianth inferior, of six nearly equal, spreading, persistent segments. June. *l.* semi-cylindrical, those on the stem dilated at the base. Stem 5in. to 6in. high. Rocky ledges of Snowdon range, Wales; mountains and Arctic regions of Northern hemisphere. SYN. *Anthericum serotinum*. (Sy. En. B. 1521.)

LOASA (the native name in South America). Including *Illairea*. ORD. *Loaseæ*. Some of the plants formerly included here are now referred to *Blumenbachia*. A genus comprising about fifty species of hardy or greenhouse, annual or biennial, decumbent or twining herbs, beset with stinging hairs, natives of tropical America (except North Brazil and Guiana). Flowers yellow, brick-red, or whitish, often showy, axillary, solitary, racemose, or sub-paniculate; petals five, cucullate, equal, spreading, inserted in the top of the tube;

FIG. 460. LIVISTONA ROTUNDIFOLIA.

Loasa—*continued.*

scales five, inserted with the petals, furnished with three sterile filaments on the back of each, and girding two subulate appendages inside. Leaves alternate or opposite, entire, lobed, or decompound. Few species are in actual cultivation, and all are easily raised from seed, sown in a light, sandy soil, about May. It is however, generally preferable to sow it in pans, in March, and place in a gentle heat, transplanting outside about the latter part of April. Except where otherwise stated, the species described below are hardy.

L. acanthifolia (Acanthus-leaved). *fl.* yellow; pedicels axillary, and also from the forks, solitary, one-flowered. Summer. *l.* cordate at the base, pinnatifid; lobes acuminated, toothed. *h.* 4ft. Chili. Annual. SYN. *L. Placei.* (B. M. 3218.)

L. aurantiaca (orange). A synonym of *L. lateritia.*

L. canarinoides (Canarina-like). *fl.* dull brick-coloured; calyx of five sub-triangular sepals; petals erect or moderately spreading, ovate, shortly acuminate, gibbous at base, reticulately veined; peduncles solitary, opposite, axillary. Summer. *l.* opposite, rather long-stalked, cordate, cordate-oblong, or fiddle-shaped, pinnatifid, dentate, deeply veined. Stems herbaceous, 10ft. to 12ft. and more long, clothed with stinging hairs. Central America. Annual. A highly dangerous plant to the touch. (B. M. 5022, under name of *Illairea canarinoides.*)

L. hispida (bristly). *fl.* bright lemon-yellow, with the centre prettily variegated with green and white; blossoms 1in. across, produced in profusion. July. *l.* oblong, stalked, deeply cut, pinnatifid or almost pinnate, pubescent. *h.* 1½ft. Lima, 1830. A very pretty branching annual. (B. M. 3057.)

L. incana (hoary). *fl.* opposite the leaves, solitary, peduncled; corolla white, ten-parted, larger segments spreading, smaller ones concave; peduncles spreading, half the length of the leaves. October and November. *l.* scattered, petioled, spreading, ovate, acute, hispid on both sides, veins and midrib prominent below. Stem round, much-branched. *h.* 2½ft. Peru, 1820. Whole plant covered with barbed white hairs, with a few stinging ones interspersed. Greenhouse perennial. (B. M. 3048.)

L. lateritia (brick-red).* *fl.* brick-red, large; peduncles twin, one-flowered, terminal, about equal in length to the leaves. May. *l.* opposite, on long petioles, pinnate; segments roundish, crenated, lobed. Chili. A prostrate half-hardy perennial. SYNS. *L. aurantiaca* and *L. tricolor.*

L. nitida (shining). *fl.*, petals yellow, red at base, spreadingly reflexed; wings of the corona very small, toothed and stalked; pedicels axillary. June to September. *l.* cordate at the base, many-lobed; lobes acute, toothed, lower ones usually pinnatifid. Chili, 1822. A trailing annual. (B. M. 2372.)

L. Pentlandii (Pentland's).* *fl.*, corolla 2in. across when expanded, spreading, but not reflexed; petals ten, orange, scarcely clawed; peduncles 4in. long, axillary. May and June. *l.* opposite, petioled, sub-erect; lamina 4in. long, 1in. broad; petiole half the length of the lamina. *h.* 4ft. Peru, 1840. Annual. (B. M. 4095.)

L. picta (painted). *fl.* white, yellow; petals bidentate; racemes terminal, leafy. June and July. *l.* rhomboid-obovate, or lanceolate-acuminated, lobed, serrated, lower ones petiolate, upper ones sessile. *h.* 1ft. Andes of Peru, 1848. Plant erect, downy. Annual. (B. M. 4428.)

L. Placei (Place's). A synonym of *L. acanthifolia.*

L. prostrata (prostrate).* *fl.* yellow; peduncles axillary, one-flowered, about twice the length of the leaves. Summer. *l.* opposite, sessile, cordate-ovate, deeply angular. Stem prostrate, flexuous. Chili, 1879. Annual. (B. M. 6442.)

L. tricolor (three-coloured). A synonym of *L. lateritia.*

L. triloba (three-lobed). *fl.* yellow, small; pedicels axillary; scales petaloid, equally and bluntly three-lobed. Summer. *l.* cordate at the base, usually three-lobed; lobes acute, toothed; middle lobe usually again somewhat three-lobed. Chili, Peru. Annual.

L. vulcanica (volcanic).* *fl.* white, about 1½in. across, axillary, spreading, with five erect nectaries of a red colour, barred with transverse yellow and white stripes. Summer. *l.* palmately three to five-lobed; lobes cut. *h.* 2ft. Ecuador, 1877. Annual. SYN. *L. Wallisii.* (B. M. 6410.)

L. Wallisii (Wallis'). A synonym of *L. vulcanica.*

LOASEÆ. An order of erect or twining, rarely frutescent, herbs, with stinging hairs, natives (except *Fissenia*, which is African) of tropical and sub-tropical America. Flowers solitary, racemose or cymose, rarely capitate; peduncles often opposite the leaves; corolla white, yellow, or dull red. Leaves opposite or alternate, entire, lobed, inciso-pinnatifid, or two or three-pinnatifid. The species are of little economic value. About ten genera and 100 species are comprised in the order. Examples: *Gronovia, Loasa.*

LOBATE. Having lobes.

LOBE. The portion of a leaf the margin of which is deeply indented or divided, but so that the incisions do not reach the midrib or petiole.

LOBELIA (named after Matthias de L'Obel, 1538-1616, a botanist, and physician to James I.). SYN. *Rapuntium.* Including *Monopsis, Rhynchopetalum, Tupa,* &c. ORD. *Campanulaceæ.* A genus comprising about 200 species of greenhouse or hardy, annual or perennial, herbs and sub-shrubs, rarely shrubs, widely distributed over the tropical and sub-tropical regions of the globe, especially in America, but less abundantly found in Northern Europe and Asia. Flowers racemose; corolla irregular, tubular; tube cleft on the upper side, thickened or ventricose at the base; limb five-parted, bilabiate, the two segments of the upper lip linear-lanceolate, the lower lip trifid and pendulous; stamens epipetalous, anthers connate. Leaves alternate, usually sessile. Lobelias rank amongst the most popular and useful of garden plants. The dwarf-growing forms are indispensable in bedding arrangements, as their place could not be taken with equally good results by any other subjects in cultivation. Blue (a colour somewhat rare amongst bedding plants) is that which predominates in Lobelias; there are also varieties with pure white, white and blue, pink and white, and wholly pink flowers. Many of the tall-growing herbaceous perennial species are splendid summer and autumn-flowering plants, equally well suited for mixed borders or for grouping in flower beds. Various colours are represented, none being more beautiful and attractive than the species or varieties with rich deep crimson flowers.

Propagation. This may readily be effected either by seeds, by cuttings, or by divisions of the plants. Named or selected varieties should be propagated by one of the latter methods, as seedlings rarely perpetuate the character of the parent, except in the case of species. For bedding purposes, where the habit of Lobelias is not always of material importance, an easy plan of securing an annual stock of plants is to sow some seeds, about March, in well-drained pans of light soil, covering them very lightly on account of their small size, and placing the pans in a propagating house. The seedlings, when large enough, should be pricked off into other pans or boxes, and kept under glass until nearly bedding time in May. Stock plants of choice varieties for propagating should either be grown in pots, or be lifted from the open ground early in autumn, and preserved in a light greenhouse or frame through the winter, where plenty of air may be admitted on favourable occasions. Early in the year, the plants should be transferred to a propagating house, and, so soon as young growths can be obtained, the cuttings must be inserted in very light sandy soil. A large quantity may thus be obtained in a short time from a few stock plants, and the habit of all will be uniform afterwards, when growing in the open air. The tall species of Lobelia may also be raised from seeds. If these are sown when ripe, and placed in a cool frame, stronger plants may be secured for the following year than when sowing is deferred till spring. Cuttings of young shoots root readily in spring, and division of the plants at the same season is also a ready method for increasing the stock, either of species or varieties.

Cultivation. Dwarf tender forms of Lobelia prefer a rather light soil, wherein plenty of leaf mould has been incorporated. When planted in bedding arrangements, they should be kept well watered throughout the summer, in order to insure a continuous flowering habit. From 4in. to 6in. apart is about the proper distance, but seedling plants will usually cover more space than others obtained from cuttings. Half-hardy perennial species should be afforded a deep rich soil, as they well repay for liberal treatment by producing much more vigorous

Lobelia—*continued.*

main flower-stems, and stronger side shoots, which also bear flowers in the autumn. Plenty of water will prove beneficial, and protection from rough wind must be provided by tying each plant to a suitable stake. When cut down by frosts, the roots may be lifted and stored in a cool frame all the winter, or they may be covered with a good depth of ashes or cocoa-nut fibre, and allowed to remain outside. The former plan is the safest, but care must be taken not to allow the roots to become too dry. Lobelias are also well adapted for culture in pots, for greenhouse decoration. They should be placed in a rich open soil, and be provided with manure water when beginning to flower.

L. amœna (pleasing). *fl.* pale blue; spikes secund, many-flowered. July and August. *l.* oblong-lanceolate, serrated, usually glabrous, 6in. to 8in. long, and 1in. broad. *h.* 1ft. to 4ft. North America, 1812. Hardy perennial. *L. colorata* (S. B. F. G. ser. ii. 180) is a garden hybrid of this species.

L. anceps (two-edged). *fl.* blue, with a white or yellowish throat; pedicels axillary, shorter than the bracts, which are linear, entire. June. *l.* obovate, toothed, superior ones dissimilar. Stems decumbent. Cape of Good Hope, 1820. Greenhouse herbaceous perennial. SYNS. *L. decumbens* (B. M. 2277), *L. rhizophyta* (B. M. 2519).

FIG. 461. FLOWERING STEM OF LOBELIA CARDINALIS.

L. cardinalis (cardinal).* Cardinal Flower. *fl.* scarlet; racemes terminal, unilateral, leafy. July and August. *l.* oblong-lanceolate, cartilaginously denticulated, and, as well as the stems, glabrous. *h.* 1ft. to 2ft. North America, 1626. A very stately and handsome herbaceous perennial. It is not perfectly hardy in our climate, but, if planted in spring, in deep rich loam, and in a situation fully exposed to the sun, it will flower well throughout the autumn, and, with protection, may be left in the ground all the winter. See Figs. 461 and 462. (B. M. 320.)

Lobelia—*continued.*

FIG. 462. LOBELIA CARDINALIS.

L. Cavanillesii (Cavanille's). A synonym of *L. laxiflora angustifolia.*

L. coronopifolia (Coronopus-leaved). *fl.* of a beautiful Gentiana-like blue; peduncles long, few-flowered. July and August. *l.* lanceolate, with three or more teeth on each side. Stem procumbent. Cape of Good Hope, 1752. Greenhouse herbaceous perennial. (B. M. 644.)

L. c. cærulea (blue). *fl.* purplish-blue, large, and drooping; peduncles three or four-flowered. Cape of Good Hope, 1824. (B. M. 2701.)

L. decumbens (decumbent). A synonym of *L. anceps.*

Fig. 463. FLOWERING BRANCH OF LOBELIA ERINUS.

L. Erinus (Erinus).* *fl.* blue, with a white or yellowish throat; peduncles axillary, solitary, much longer than the leaves. Summer. *l.* hairy at the base, toothed, lower ones obovate, petiolate; upper ones almost sessile, narrow-lanceolate. *h.* 6in. Cape of Good Hope, 1752. Greenhouse herbaceous perennial. (B. M. 901.) The varieties of this popular species are very numerous, and are separated into five sections, viz.: 1, *compacta*, neat and compact-growing, having both blue and white

Lobelia—*continued.*

flowered forms; 2, *Paxtoniana*, much after the style of the *speciosa* group; 3, *pumila*, the dwarfest of all, including the forms known as *grandiflora* and *magnifica*; 4, *ramosoides*, rather tall-growing, attaining from 6in. to 9in. in height; 5, *speciosa*, a popular section, not quite so compact-growing as some of the others. There are double-flowered forms, but they are not extensively cultivated, on account of their uncertainty in growing and flowering satisfactorily.

L. Feuillei (Feuille's). A synonym of *L. Tupa.*

FIG. 464. LOBELIA FULGENS, showing Habit, and detached portion of Stem with fully opened and young Flower.

L. fulgens (shining).* *fl.* of a splendid scarlet colour, about 1in. long, downy outside; racemes terminal, leafy, somewhat secund. May to September. *l.* lanceolate, denticulated, with revolute margins, downy, as well as the stems, which are reddish. *h.* 1ft. to 2ft. Mexico, &c., 1809. A very handsome greenhouse or half-hardy herbaceous species, resembling *L. cardinalis*, but more downy; it requires similar treatment. See Fig. 464. (A. B. R. 659.) SYN. *L. ramosa* (B. ii. 93).

L. glandulosa (glandular). *fl.* blue; raceme or spike loosely few or many-flowered, secund. September. *l.* thick and smooth, bright green, lanceolate or linear, callous or glandular-denticulate. *h.* 1ft. to 4ft. South United States, 1840. Hardy herbaceous perennial.

L. glandulosa (glandular), of Lindley. A synonym of *L. syphilitica.*

L. gracilis (slender). *fl.* deep blue; upper lip of corolla densely bearded; racemes rather secund. Summer. *l.*, lower ones nearly ovate, deeply pinnatifid; superior ones linear-lanceolate, nearly entire. *h.* 2ft. New South Wales, 1801. Hardy annual. (A. B. R. 3406; B. M. 741.)

L. g. major (greater). A variety with larger flowers and more deeply toothed leaves. SYN. *L. trigonocaulis.* (B. M. 5088.)

L. heterophylla (variable-leaved), of Hooker. A synonym of *L. tenuior.*

L. hypocrateriformis (salver-shaped). A synonym of *Isotoma Brownii.*

L. ilicifolia (Ilex-leaved). *fl.* pink; corolla resupinate; pedicels axillary, solitary, much longer than the leaves. May to September. *l.* ovate-lanceolate, deeply and remotely toothed, glabrous. Barren stems prostrate, floriferous ones erect. *h.* 3in. to 6in. Cape of Good Hope, 1815. Greenhouse herbaceous perennial. (B. M. 1896.)

L. Kalmii (Kalm's). *fl.* blue; racemes loose, and mostly few-flowered, often leafy at base or panicled; pedicels equalling or longer than the flowers. July. *l.*, radical and lowest cauline ones oblanceolate or spathulate; upper ones linear, 1in. to 2in. long. *h.* 1ft. North America, 1820. Hardy herbaceous perennial. (B. M. 2238.)

L. Kraussii (Krauss's). *fl.*, corolla red, 1in. long, marcescent; tube compressed, spreading a little; calyx red, glabrous, persistent; peduncles 3in. long, axillary, solitary, numerous towards the top of the stem. January and February. *l.* 4½in. long, ¾in. broad, numerous, scattered, lanceolate, glabrous, shining green above, paler below, sharply serrated. *h.* 1ft. to 1½ft. Dominica, 1828. Greenhouse herbaceous perennial. (B. M. 3012.)

L. laxiflora (loose-flowered). *fl.* red, downy; tube nearly 1in. long; pedicels solitary, axillary, longer than the leaves, the whole forming a leafy raceme. June and July. *l.* ovate-lanceolate, acuminated, serrated, sessile. *h.* 3ft. Mexico, Central America, 1825. Greenhouse herbaceous perennial. (S. B. F. G. ser. ii. 389, under name of *Siphocampylus bicolor.*)

L. l. angustifolia (narrow-leaved) has narrower leaves and yellow flowers. (B. M. 3600, under name of *L. Cavanillesii.*)

L. longiflora (long-flowered). A synonym of *Isotoma longiflora.*

L. pedunculata (stalked). A synonym of *L. tomentosa.*

Lobelia—*continued.*

L. polyphylla (many-leaved). *fl.* solitary, axillary, often terminated with a crown of barren leaves; racemes terminal; corolla deep-blackish or blood-purple, curved. September. *l.* erecto-patent, coriaceous, oblong-lanceolate, acute, scarcely petiolate, of a bluish-green, and paler beneath, reticulated with veins, the sides often turned upwards. *h.* 4ft. Chili, 1835. Hardy herbaceous perennial. (B. M. 3550.)

L. puberula (puberulous). *fl.* blue, partly white, sometimes varying to white, mostly crowded, becoming horizontal on the short appressed pedicels. Summer. *l.* from ovate to oblong, mostly obtuse, pale or slightly hoary. *h.* 2ft. North America. Plant soft, pubescent with very short and fine hairiness. Hardy herbaceous perennial.

L. p. glabella (smoothish). A greener form, with slender, more glabrous, and usually more naked, virgate spike, glabrous calyx, &c., and flowers more secund. (B. M. 3292.)

L. pyramidalis (pyramidal). *fl.*, corolla purplish-violet; anthers deep blue, hairy; racemes panicled, leafy. Autumn. *l.* lanceolate, long-acuminated, serrated; upper ones linear, attenuated. Stem pyramidally branched. *h.* 3ft. to 4ft. Nepaul, 1822. Hardy herbaceous perennial. (B. M. 2387.)

L. ramosa (branched). A synonym of *L. fulgens.*

L. rhizophyta (creeping). A synonym of *L. anceps.*

L. robusta (thick-stemmed). *fl.* large, very numerous; corolla deep dull purple, falcate before the separation of the segments; raceme terminal, gradually elongated. August. *l.* numerous, scattered, crowded towards the apex, falling off below, obovate-lanceolate, acuminate, attenuated at base. Stem stout, erect, almost woody. *h.* 3ft. Hayti, 1830. Stove evergreen. (B. M. 3138.)

L. senecioides (Senecio-like). A synonym of *Isotoma axillaris.*

L. Speculum (conspicuous). *fl.* deep blue, with yellow anthers; peduncles very long, solitary, axillary, one-flowered, naked. Summer. *l.* linear-lanceolate, irregularly toothed or entire, alternate. Cape of Good Hope, 1812. Plant prostrate. Greenhouse annual. SYN. *Monopsis conspicua.* (A. B. R. 664; B. M. 1499.)

L. splendens (splendid).* *fl.* scarlet, glabrous, very like those of *L. cardinalis* and *L. fulgens*; racemes terminal, somewhat secund. May to September. *l.* lanceolate, denticulated, with flat margins. *h.* 1ft. to 2ft. Mexico, &c., 1814. Half-hardy herbaceous perennial. There is a variety, *atrosanguinea*, figured in B. M. 4002.

L. syphilitica (syphilitic).* *fl.* light blue, axillary, solitary, forming altogether a long, leafy raceme; corolla angular, with nearly equal segments. Autumn. *l.* ovate-oblong, acuminated at both ends, unequally serrated, sessile. *h.* 1ft. to 2ft. North America, 1665. Hardy herbaceous perennial. There are numerous hybrids between this species and some of the scarlet-flowered ones. (B. R. xxxii. 6, under name of *L. glandulosa.*)

L. tenuior (slender). *fl.* large, deep blue, with a white eye, the calyx-tube narrow; middle lobe of corolla broadly obovate; lateral ones also obovate, the two upper much smaller, incurved. September. *l.*, radical ones small, obovate, deeply toothed; cauline ones linear, lower ones pinnatifid, upper ones entire or toothed. Stems often 1ft. or more high, one or few-flowered. West Australia. Greenhouse herbaceous perennial. (B. M. 3784 and P. M. B. vi. 197, under name of *L. heterophylla.*)

L. thapsoidea (Mullein-like). *fl.* large, densely imbricated; corolla rose-purple, hairy or silky; raceme large, pyramidal; pedicels (especially the lower ones) reflexed when in flower. June. *l.* broadly lanceolate, attenuated below; lower ones 1ft. to 1½ft. long, all downy, dentato-ciliate. Stem erect, leafy, simple. *h.* 6ft. to 8ft. Organ Mountains, 1843. Greenhouse herbaceous perennial. (B. M. 4150.)

L. tomentosa (tomentose). *fl.* blue, with a purple tube, small; peduncles elongated, growing from the sides of the branches. October. *l.* petiolate, recurved, pinnatifid; pinnæ bifurcate, tomentose. *h.* 1ft. Cape of Good Hope, 1819. Greenhouse herbaceous perennial. (B. M. 2251, under name of *L. pedunculata.*)

L. trigonocaulis (three-angled-stemmed). A synonym of *L. gracilis major.*

L. Tupa (Tupa). *fl.*, corolla of a reddish-scarlet colour, large, and, as well as the peduncles and calyces, downy; racemes terminal, spicate. Autumn. *l.* ovate-lanceolate, sessile, decurrent, clothed with soft, whitish down. Stem erect, thick, suffruticose at the base, simple, leafy. *h.* 6ft. to 8ft. Chili, 1824. Half-hardy perennial, and said to be a very poisonous species. SYNS. *L. Feuillei* and *Tupa Feuillei.* (B. M. 2550.)

Varieties. In the bedding or dwarf section of Lobelias there are numerous named varieties, which, however, are frequently so near alike in colour as to be readily used as substitutes one for another. *L. speciosa* is an old type still largely grown, as it proves very useful for trailing over vases, &c. *L. pumila magnifica* is one of the very best blue varieties for any purpose. Cuttings must be inserted for preserving the compact habit of any named sort; seedlings will not perpetuate such characteristics. A list of other varieties is subjoined.

BLUE BEAUTY, deep blue, with small white eye, free-growing, and of good habit; FINSBURY PARK BLUE, bright blue self-coloured

Lobelia—*continued.*

flowers, very free; LUSTROUS, rich blue, fine white eye; OMEN, pink, small white eye, dwarf, and very distinct; PRINCESS OF WALES, pure white, very dwarf and floriferous; PUMILA GRANDIFLORA FLORE-PLENO, dark blue, a double-flowered form, sometimes grown, but does not always succeed well; PUMILA INGRAMI, white, slightly tinged with blue, of trailing habit; PUMILA MAGNIFICA, deep indigo-blue, small white eye, compact and floriferous habit throughout the season; SNOWBALL, white, dwarf compact habit, good; SWANLEY BLUE, light blue, rather vigorous habit.

LOBELIACEÆ. A tribe of *Campanulaceæ.*

LOBOSTEMON (from *lobos*, a lobe, and *stemon*, a stamen; in allusion to the stamens being inserted opposite the corolla lobes). SYN. *Echiopsis.* ORD. *Boragineæ.* A genus of greenhouse, scabrous-canescent or hispid, perennial herbs, sub-shrubs, or shrubs, confined to South Africa, allied to *Echium.* About fifty species have been enumerated, but many of these are not sufficiently distinguished to merit specific rank. Flowers white or bluish, in terminal cymes, sometimes densely capitate, sometimes in few scorpioid, somewhat elongated, loose branches; calyx segments five; corolla tubular-funnel-shaped, with five round, imbricated lobes. Nutlets four. Leaves alternate, sessile, granuloso-tuberculate or hispid, rarely almost glabrous. For culture, *see* **Echium.**

L. argenteus (silvery). *fl.* in spicate racemes; corolla blue; spikes terminal, simple, leafy. June. *l.* lanceolate, callous-acute, 1½in. to 2in. long. Stem shrubby, branched. *h.* 3ft. 1789. (A. B. R. 154, under name of *Echium argenteum.*)

L. ferocissimus (very fierce). *fl.* in spicate racemes; corolla blue; spikes simple, terminal, leafy. June. *l.* 1½in. to 2in. long, sessile, lanceolate. Stem shrubby, with prickly branches. *h.* 5ft. 1794. (A. B. R. 39, under name of *Echium ferocissimum*).

L. formosus (showy). *fl.* in sub-cymose, few-flowered racemes; corolla pink, tube twice as long as the calyx. June. *l.* narrow-lanceolate, papilloso-scabrous above, glabrous beneath; margin denticulate. Stem shrubby, with glabrous branches. *h.* 3ft. 1787. (A. B. R. 20 and B. R. 124, under name of *Echium grandiflorum.*)

L. fruticosus (shrubby). *fl.* in spicate racemes; corolla reddish at first, afterwards becoming blue; spikelets crowded. May. *l.* lanceolate or obovate-lanceolate, attenuated at base, silky-villous. Stem shrubby, branched. *h.* 3ft. 1759. (B. M. 1772 and B. R. 35, under name of *Echium fruticosum.*)

L. glaucophyllus (glaucous-leaved). *fl.*, corolla pale violet; spikelets bifid, bracteate. May. *l.* erect, lanceolate, acute, glabrous, glaucous; margins calloso-scabrous. Stem shrubby, branched, very glabrous. *h.* 2ft. 1792. (A. B. R. 165, under name of *Echium glaucophyllum*).

L. Swartzii (Swartz's). *fl.*, corolla blue; spikelets terminal, bi- or trifid, few-flowered. June. *l.* linear-lanceolate, acuminate, glabrous, callous-dotted on the margin and (rarely) beneath; young ones slightly hispid, ciliated. Stem shrubby, branched above, glabrous. *h.* 2ft. 1816.

LOCHERIA. Included under *Achimenes.*

LOCKHARTIA (named in honour of David Lockhart, a traveller, who introduced *L. elegans*). SYN. *Fernandezia.* ORD. *Orchideæ.* A genus comprising about half-a-score species of stove epiphytal orchids, inhabiting tropical America, from Brazil to the West Indies and Mexico. Flowers small and mediocre, rather long-stalked; sepals and petals sub-equal, free, spreading or laterally reflexed; lip free at base of column; column very short; peduncles in the upper axils, sometimes one or two-flowered, sometimes loosely but slenderly paniculate-branched. Stems fasciculate, erect, simple. Pseudo-bulbs none. The species are more interesting than ornamental. They should be grown on blocks, in a hot, damp stove.

L. acuta (acute). *fl.* yellow, red; lip linear, three-lobed, the lateral lobes parallel with the middle one; corymbs loosely many-flowered. June. *l.* acuminate, carinate. *h.* 6in. Trinidad, 1834. (B. R. 1806, under name of *Fernandezia acuta.*)

L. elegans (elegant). *fl.* pedunculate, solitary, from the axil of one of the upper leaves; petals pale yellow, oblong-ovate; lip erect, yellow, spotted with red, thick and fleshy; peduncle slender, drooping. *l.* close-placed, distichous, equitant, ovate-oblong, very obtuse. Stems 3in. to 5in. high. Trinidad, 1827. (B. M. 2715.)

L. verrucosa (warted). *fl.* bright yellow, barred and spotted with red on the lower part of the lip; sepals oblong; lip longer and larger than the ovate petals. *l.* 1½in. long, keeled, sharp at the extremities. Stems upright, closely imbricated, about 1ft. high. Guatemala, 1841. (B. M. 5592, under name of *Fernandezia robusta.*)

LOCULAR. Divided into cells.

LOCUST-TREE. The common name for the genus *Robinia*; also used for *Ceratonia Siliqua* and *Hymenæa.*

LODDIGESIA (named after Conrad Loddiges, founder of a once celebrated nursery at Hackney). ORD. *Leguminosæ.* A monotypic genus, the species being a greenhouse evergreen shrub, closely allied to *Hypocalyptus.* It requires sandy-peat soil, to which should be added a small quantity of loam. Propagated by cuttings, made in April, and inserted under a bell glass, in sandy soil.

L. oxalidifolia (Oxalis-leaved). *fl.* pinkish; keel dark purple at the apex; umbels three to eight-flowered. June. *l.* trifoliolate; leaflets obcordate, mucronate; stipules subulate. *h.* 1ft. to 3ft. Cape of Good Hope, 1802. Plant much-branched, smooth. (B. M. 965.)

LODOICEA (said to be altered from Laodicea, so called after Laodice, daughter of Priam). Coco de Mer; Double Cocoa-nut. ORD. *Palmeæ.* A monotypic genus, the species being a stove palm, very rarely seen in cultivation. It thrives best in a compost of rich loam and leaf mould, in equal parts. Thorough drainage, an abundant supply of water, and very strong heat, are essential elements to success in the culture of this plant. The seeds being very large, one of the chief difficulties in establishing this plant is its peculiar manner of germination; the radicle grows down in the form of a stout tap root for 3ft. or more, and, splitting open at the end, allows the plumule to ascend. If this long outgrowth be checked or injured in any way, success cannot be hoped for. The heavy seed can be kept on or in one pot, and the growing radicle allowed to push into another, keeping the whole dark until the development of the young plant, from which the seed should not be separated until the connection between the two falls naturally.

L. sechellarum (Seychelles). *fl.* produced on separate plants, both having three sepals and three petals. *fr.* very large, covered externally with a thick fibrous husk, and containing one, two, or even three immense stones or nuts, with very hard and thick black shells, each being divided half-way down into two lobes. *l.* large, fan-shaped, sometimes 20ft. long, and 6ft. wide. Trunk nearly cylindrical, scarcely 1ft. in diameter, bearing a crown of leaves. *h.* 50ft. to 100ft. Seychelles Isles. The fruits of this plant average about 40lb. in weight. (B. M. 2734.)

LŒSELIA (named after John Lœsel, author of "Flora Prussica"). SYN. *Hoitzia.* ORD. *Polemoniaceæ.* A genus comprising six or seven species of slightly viscid, pubescent or glabrous, rigid, greenhouse under-shrubs or herbs, rarely small shrubs, natives of Mexico, Central America, and New Grenada. Flowers scarlet or violet, axillary, the upper ones often crowded at the apices of the branches; calyx five-cut; corolla funnel-shaped. Leaves alternate or opposite, undivided, often argutely toothed. The species thrive in a compost of fibry peat and sandy loam. Propagation may be effected by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in heat.

L. coccinea (scarlet). *fl.* solitary, on short peduncles; corolla scarlet. June. *l.* nearly sessile, ovate, acutely mucronate, cuneate at base, scabrous above, hairy beneath. *h.* 3ft. to 4ft. Mexico, 1824. Shrub.

L. glandulosa (glandular). *fl.* solitary, pedunculate; corolla red. June. *l.* ovate-lanceolate, petiolate, spiny-toothed; those on the branches nearly linear. Stem suffruticose, beset with glandular hairs. *h.* 2ft. Mexico, 1825.

LOGANIA (named after James Logan, 1674-1751, born in Ireland, afterwards Governor of Pennsylvania, a writer on botany). SYN. *Euosma.* ORD. *Loganiaceæ.* A genus comprising twenty-one species of greenhouse, glabrous herbs or sub-shrubs, rarely much-branched, tufted, or divaricate small shrubs. Three are natives of New Zealand, and the rest are confined to Australia. Flowers white or flesh-colour, often small; corolla campanulate, or tube cylindrical, sub-hypocrateriform; lobes five, rarely four, spreading; cymes terminal or axillary, sometimes loosely trichotomous, occasionally in a sessile head, sometimes reduced to a single flower. Leaves opposite, entire, connected by a raised stipular line or short sheath, or rarely with small setaceous stipules. Loganias require a well-drained compost of sandy loam and fibry peat. Propa-

Logania—*continued.*

gated, during summer, by nearly-ripened side shoots, placed in a sandy soil, under a bell glass. Probably the two species described below represent all introduced.

L. floribunda (bundle-flowered). *fl.* white; racemes axillary, compound, shorter than the leaves. April and May. *l.* lanceolate, attenuated at both ends, smooth; stipules lateral, setaceous. *h.* 2ft. to 3ft. Australia, 1797. (L. B. C. 1118; A. B. R. 520, under name of *Euosma albiflora*.)

L. latifolia (broad-leaved). *fl.* white, disposed in terminal panicles, composed of opposite, dichotomous, and trichotomous peduncles. Summer. *l.* obovate, acutish at both ends. *h.* 3ft. to 4ft. Australia, 1816.

LOGANIACEÆ. A natural order of herbs, shrubs, or trees, of variable habit, closely allied to *Rubiaceæ*. They inhabit chiefly warm and tropical countries. Flowers often red, white, purplish, or pale citron, rarely yellow, axillary and solitary, or racemose or corymbose, sometimes in a terminal corymb or panicle. Leaves opposite, stipulate, or exstipulate when the dilated and connate bases of the petioles embrace the stem, with a short, sometimes obsolete border. Stem woody, rarely herbaceous. Most Loganiaceæ have a very bitter juice. The species of *Strychnos* contain in the bark of their root, and in their seeds, two alkaloids, combined with a peculiar acid, the principles which are extremely energetic; their action on the nervous system is very powerful. There are about thirty genera and 350 species. Examples: *Gærtnera, Logania, Spigelia, Strychnos*.

LOGWOOD. *See* **Hæmatoxylon.**

LOISELEUREA (named after Loiseleur Deslongchamps, 1774-1849, a French botanist, who published a Flora of France, and other botanical works). SYNS. *Chamæcistus, Chamædon.* ORD. *Ericaceæ*. A monotypic genus, the species being a low-trailing evergreen shrub, well adapted for cultivating in rock-gardens, in a moist sandy-peat soil. Propagated by layers.

L. procumbens (trailing). *fl.* rose, small, in short, terminal clusters; corolla bell-shaped. July. *l.* about ¼in. long, opposite, revolute, smooth. Branches spreading and procumbent. Arctic and alpine regions of Northern hemisphere (Britain—only in the Scotch Highlands). SYN. *Azalea procumbens.* (Sy. En. B. 884.)

LOLIUM (the old Latin name, used by Virgil and Pliny). ORD. *Gramineæ*. A widely-dispersed genus of grasses. Upwards of twenty species have been described; these may probably (according to Bentham and Hooker) be reduced to two or three. They are of no value for horticultural purposes. The "tares" of Scripture are supposed to refer to the Darnel, *L. temulentum*. *L. italicum*, the Italian Rye Grass of agriculturists, is one of the numerous cultivated annual or biennial forms (not known in a wild state) of the common British *L. perenne*.

LOMAGRAMME PTEROIDES. According to Mr. Baker, this is an abnormal form of *Acrostichum Blumeanum*, with the sori in a line along the edge of pinnæ, rather narrower than the usual barren ones.

LOMARIA (from *loma*, an edge; referring to the position of the spores on the fronds). ORD. *Filices*. Including *Lomaridium, Lomariopsis*. A rather large genus (about fifty species) of handsome stove, greenhouse, or hardy ferns, of world-wide distribution, but having its head-quarters in the South temperate zone. Fronds dimorphous, usually once pinnatifid or pinnate, rarely simple or bipinnate. Sori linear, continuous, parallel with the midrib, and occupying the whole or nearly the whole of the space between it and the edge; involucre membranous, formed of the revolute edge of the frond. The species of this genus are, for the most part, unexcelled for the decoration of conservatories, dinner tables, &c. The large-growing species thrive best in a compost of loam and peat, to which may be added a small quantity of silver sand. The smaller sorts will require scarcely any loam. For general culture, *see* **Ferns.**

L. alpina (alpine).* *rhiz.* slender, wide-creeping, clothed with lanceolate ferruginous scales at the crown. *barren fronds* 4in. to 8in. long, ¼in. to ⅔in. broad, linear-lanceolate, with spreading, close-placed, linear-oblong, obtuse pinnæ, ⅛in. long, ⅛in. broad. *fertile fronds* on stipes 4in. to 12in. long; pinnæ narrower and more distant. Involucre slightly intramarginal. Brazil. A smaller plant than *L. Spicant*, with a slender, wide-creeping rhizome, and the pinnæ, especially of the fertile frond, broader and shorter. Half-hardy. See Fig. 465.

FIG. 465. LOMARIA ALPINA.

L. attenuata (narrowed).* *cau.* long, horizontal, stout, densely clothed at the apex with linear-subulate, light brown scales. *sti.* 4in. to 6in. long, erect, naked or slightly scaly below. *fronds* 1ft. to 3ft. long, 6in. to 9in. broad, ovate, narrowed very gradually downwards; barren pinnæ numerous, contiguous, spreading, linear, 3in. to 4in. long, ¼in. to ⅔in. broad, narrowed gradually towards the point, which is sometimes bluntly serrated, dilated on both sides at the base; fertile pinnæ as numerous, but only half to one line broad. Tropical America. A very beautiful and distinct stove species. SYN. *L. gigantea.*

L. Banksii (Banks'). *cau.* stout, woody, elongated, scaly upwards. *sti.* 3in. to 4in. long, erect, scaly below. *barren fronds* lanceolate, 6in. to 9in. long, about 1in. broad; pinnæ spreading, oblong, obtuse, ⅜in. to ½in. long, ¼in. broad, close-placed, passing gradually downwards into a sinuated decurrent wing to the stem. *fertile fronds* smaller and more slender; pinnæ narrower and more distant. New Zealand. Greenhouse.

L. blechnoides (Blechnum-like).* *cau.* creeping. *barren fronds* short-stalked, lanceolate, about 6in. long, 1in. to 1½in. broad; upper pinnæ ⅔in. long, ⅜in. broad, dilated at the base, rather falcate, point blunt; lower ones narrowed gradually into mere auricles. *fertile fronds* 1ft. to 1½ft. long, 3in. broad. *sti.* 6in. long, strong, erect; pinnæ 1½in. to 2in. long, ⅛in. broad, dilated suddenly at the base, the upper ones ⅓in. to ⅜in. apart. Chili. Very closely allied to *L. lanceolata*, but with larger fertile fronds, with pinnæ widened suddenly at the base on both sides. Greenhouse.

L. Boryana (Bory's).* *cau.* stout, erect, 1ft. to 2ft. high, woody, densely scaly. *sti.* stout, erect, 4in. to 6in. long. *barren fronds* ovate, 1ft. to 2ft. long, 6in. to 8in. broad; pinnæ close-placed, erecto-patent, lanceolate, narrowed gradually to the point, narrowed and sometimes auricled at the base, 3in. to 6in. long, ½in. or rather more broad. *fertile fronds*, pinnæ narrow, linear, rather close. Involucre brown, membranaceous, fimbriated, sometimes slightly intramarginal. West Indies to Falkland Islands, South Africa, &c. Greenhouse. SYN. *L. magellanica.* (H. G. F. 52.) *L. robusta* is a stout-growing form of this species, with densely scaly rachis.

L. B. cycadoides (Cycas-like). *trunk* stout, massive, furnished about the crown and base of stipes with a profusion of long black scales. *fronds* pinnate, coriaceous, 1ft. to 2ft. long; pinnæ large, lanceolate-oblong, blunt, deep green, the fertile ones linear-lanceolate, recurved at the apex. South-east Africa, 1875. Greenhouse.

L. B. Dalgairnsiæ (Miss Dalgairns'). *trunk* blackish, shaggy at apex, with long, subulate, dark brown scales. *fronds* subcoriaceous, lanceolate, pinnate; pinnæ lanceolate, acute, the terminal ones confluent, dark green above pale beneath. South Africa, 1877.

L. capensis (Cape). A form of *L. procera.*

L. chilensis (Chilian). A form of *L. procera.*

L. ciliata (fringed).* *cau.* 9in. high, 1½in. thick. *sti.* slightly scaly below. *fronds* not numerous, 8in. to 12in. long, ovate-oblong, simply pinnate; barren pinnæ linear-oblong, the lower ones distant and narrowed below, the upper more approximate, adnato-decurrent, with a broad rounded auricle at the base on the lower side, bluntish, frequently emarginate or bifid, margins lobed and spinuloso-ciliated; fertile pinnæ narrow-linear, decurrent, sometimes slightly pinnatifid. New Caledonia. Stove. Allied to *L. gibba.*

L. Colensoi (Colenso's). A synonym of *L. Patersoni elongata.*

L. crenulata (scolloped). A synonym of *L. Germainii.*

L. Cumingiana (Cuming's). A synonym of *L. Patersoni.*

L. discolor (two-coloured).* *cau.* stout, ascending. *sti.* 3in. to 6in. long, strong, densely scaly at the base. *fronds* 1ft. to 3ft. long, the barren ones 4in. to 6in. broad, narrowed gradually at the base; pinnæ numerous, spreading, contiguous, linear, 2in. to 3in. long, ⅜in. broad, cut down very nearly to the rachis, narrowed suddenly towards the point, margin wavy; fertile pinnæ as numerous, but narrower and shorter. Australia, &c. Greenhouse.

Lomaria—*continued.*

L. d. nuda (naked). This variety differs from the type in its less coriaceous texture, castaneous stems, and more numerous, narrower, acuminate pinnæ.

L. dura (hard). *cau.* erect, sub-arborescent. *sti.* 1in. long, thick, erect, scaly at the base. *fronds* 1ft. or more long, lanceolate, cut down to the rachis below; barren pinnæ, the lower ones dwarfed into rounded lobes, the middle ones oblong sub-falcate, the upper ones narrower and more acuminated; fertile pinnæ shorter, crowded, broadish, very blunt, decurrent at the base above. Involucre transversely wrinkled, the margin fimbriated. Chatham Islands, 1866. Hardy. SYN. *L. rigida.*

L. elongata (elongated). A synonym of *L. Patersoni elongata.*

L. filiformis (filiform). *rhiz.* scandent, stout. *sti.* distant, 1in. to 4in. long. *barren fronds* ovate-lanceolate, 1ft. to 2ft. long, 3in. to 4in. broad; pinnæ numerous, spreading, linear, 2in. to 3in. long, ½in. broad, distinctly stalked, narrowed gradually towards the point and regularly crenato-dentate throughout; frond of the lower part of the caudex often much smaller, linear in general outline, 3in. to 4in. long, 1in. broad, with oblong, obtuse, sharply-toothed pinnæ. *fertile fronds* ovate, with numerous narrowly-linear pinnæ, 3in. to 4in. long. New Zealand, &c. Greenhouse. SYNS. *Lomariopsis heteromorpha* and *Stenochlæna heteromorpha.*

L. fluviatilis (floating). *cau.* 3in. to 4in. long, stout, scaly towards the crown. *sti.* 3in. to 4in. long, erect, densely scaly. *barren fronds* linear, 6in. to 18in. long, 1in. to 2in. broad; pinnæ oblong, obtuse, spreading, not decurrent, ½in. to ¾in. long, ¼in. to ⅜in. broad, the upper ones nearly contiguous, the lower ones shorter and more distant. *fertile fronds*, pinnæ linear-obtuse, ½in. to ¾in. long, ⅛in. broad, erecto-patent. New Zealand, &c. Greenhouse.

L. Fraseri (Fraser's).* *cau.* elongated, stout, sub-erect, densely clothed with linear scales at the crown. *sti.* 4in. to 6in. long, strong, erect, scaly. *fronds* ovate, acuminate, bipinnatifid, 1ft. to 1½ft. long, 4in. to 6in. broad; pinnæ linear-lanceolate, the lower ones 2in. to 3in. long, ½in. to ¾in. broad, cut down very nearly to the rachis into linear-oblong, mucronate, slightly-toothed pinnules, their bases decurrent into a pinnatifid wing to the main rachis with triangular lobes; fertile frond similar in size and cutting. New Zealand, 1843. A very elegant greenhouse species, and quite distinct.

L. Germainii (Germain's). *cau.* elongated, scaly at the apex. *sti.* 1in. to 2in. long, erect, firm, scaly. *barren fronds* 2in. to 3in. long, ¾in. to 1in. broad, oblong-lanceolate, with imbricated, spreading, linear-obtuse, crenate pinnæ, the largest ⅜in. long, ⅛in. broad, the lower ones distant, and narrowing down gradually to mere auricles. *fertile fronds* on longer stalks, with pinnæ nearly as broad and close as the others. Chili. Greenhouse. SYN. *L. crenulata.* (H. S. F. iii. 152.) Most like *L. alpina* in size and habit.

L. gibba (gibbous).* *cau.* 2ft. to 3ft. high. *sti.* short, strong, erect, densely scaly below. *fronds* 2ft. to 3ft. long, 6in. broad, both barren and fertile with very numerous erecto-patent pinnæ on each side, those of the former 4in. to 6in. long, ½in. to ⅜in. broad, cut down nearly to the rachis, dilated and connected at the base, the lower ones growing shorter very gradually, margin nearly entire; fertile pinnæ 4in. to 6in. long, ⅜in. broad. *sori* occupying the whole space between the edge and midrib. New Caledonia, &c., 1862. Stove or greenhouse. The variety known as *Bellii* is a handsome form, producing long forked fronds, which are densely tasselled at the apex, as also are the points of all the pinnæ.

FIG. 466. LOMARIA GIBBA ROBUSTA.

L. g. robusta (robust).* A garden form, of more robust habit, and with broader pinnæ, than the type. See Fig. 466.

Lomaria—*continued.*

L. gigantea (gigantic). A synonym of *L. attenuata.*

L. Gilliesii (Gillies'). A synonym of *L. procera.*

L. lanceolata (lanceolate). *cau.* elongated, and densely clothed with dark brown, linear scales. *sti.* 4in. to 6in. long, firm, erect. *fronds* 6in. to 12in. long, 2in. to 4in. broad; the barren ones lanceolate, narrowed very gradually below; pinnæ close, slightly falcate, 1in. to 1½in. long, ¼in. to ⅜in. broad, gradually narrowed to a point or bluntish, slightly toothed; fertile pinnæ linear, spreading or falcate, about ⅛in. apart at the base. Australia, &c. A pretty greenhouse species.

L. L'Herminieri (L'Herminier's). *cau.* ultimately elongated, densely scaly. *sti.* 4in. to 6in. long, strong, erect. *barren fronds* ovate-lanceolate, 9in. to 15in. long, 3in. to 4in. broad; pinnæ dilated at the base, slightly falcate, 2in. or rather more long, ½in. broad, point bluntish, a few of the lower ones cut down suddenly into mere auricles; fertile pinnæ 2in. to 3in. long, ⅛in. broad; the lower ones ½in. to 1in. apart at the base. West Indies to Chili. Stove. (H. G. F. 40.)

L. magellanica (Magellan). A synonym of *L. Boryana.*

L. nigra (black).* *cau.* stout, clothed at the crown with linear scales. *sti.* slender, erect, densely scaly, 2in. to 3in. long. *barren fronds* 4in. to 6in. long, 1in. to 1½in. broad, linear-oblong, with a large, bluntish, sinuated point, cut down below to the rachis into numerous roundish-oblong, sinuated pinnæ on each side, which are ¼in. to ⅜in. long, ⅛in. to ¼in. broad, the lower ones quite distinct, and a short distance from one another. *fertile fronds* with longer stalks, the terminal pinna long-linear, the lateral ones linear, erecto-patent. New Zealand. Greenhouse. (H. S. F. iii. 35.)

L. onocleoides (Onoclea-like). *rhiz.* long-scandent, densely scaly. *barren fronds* on stipes 3in. to 4in. long, lanceolate, 1ft. to 1½ft. long, 1in. to 2in. broad, narrowed very gradually below; pinnæ 1in. or less long, ¼in. to ⅜in. broad, lanceolate, dilated at the base, narrowed gradually towards the point. *fe tile fronds* on stipes 4in. to 6in. long; pinnæ linear, 1in. to 1½in. long. Involucre broad, involute. West Indies, &c. Stove. (H. S. F. 146.)

L. Patersoni (Paterson's). *rhiz.* short-creeping. *sti.* 2in. to 3in. long, wiry, erect, rather scaly below. *barren fronds* about 1ft. long, under 1in. broad, broadest one-third of the distance from the top, narrowed very gradually downwards; point acuminate, margin cartilaginous and wavy. *fertile fronds* as long, but only ⅛in. broad. *sori* occupying the whole space between the midrib and margin. South Africa. A very pretty greenhouse species. SYN. *L. Cumingiana.* (H. S. F. 143.)

L. P. elongata (lengthened). A variety having both barren and fertile fronds pinnatifid, 2ft. or more long, the former cut down nearly to the rachis into six to nine pinnæ on each side, which are often 6in. to 9in. long, nearly 1in. broad, and suddenly decurrent at the base; the fertile pinnæ often numerous on each side, erecto-patent, 6in. long, ⅛in. broad. Neilgherries and Ceylon. Stove. SYNS. *L. Colensoi, L. elongata,* and *L. punctata.*

L. procera (tall).* *cau.* stout, woody, elongated, clothed with large scales. *sti.* 6in. to 12in. long, stout, erect, scaly below. *barren fronds* ovate, 1ft. to 3ft. long, 6in. to 12in. broad; pinnæ linear, 3in. to 12in. long, ½in. to 1in. broad, the lower ones stalked, base rounded or even cordate, sometimes auricled, point narrowed gradually. *fertile fronds* narrowly linear, distant, 4in. to 6in. long, ½in. broad. Involucre broad, membranaceous, ciliated, sometimes slightly intramarginal. Mexico, West Indies, Australia, &c. Greenhouse. SYN. *L. Gilliesii.* (H. S. F. 53.) *L. capensis* and *L. chilensis* are large-growing forms.

L. p. ornifolia (Ash-leaved). *fronds* 3ft. long, with as many as forty pinnæ; the lower ones distinctly stalked, and often furnished with glands. SYN. *L. tuberculata.*

L. p. vestita (clothed). A form with densely paleaceous rachis. SYN. *L. vestita.*

L. pumila (dwarf).* *rhiz.* slender, creeping, clothed with bluntish scales at the apex. *fertile fronds* on stipes 3in. to 4in. long; pinnæ linear-oblong, with a considerable space between them. *barren fronds* lanceolate, 3in. to 4in. long, ½in. broad; pinnæ spreading, linear-oblong, obtuse, crenated, ⅛in. long, ⅛in. broad. New Zealand. Half-hardy.

L. punctata (dotted). A synonym of *L. Patersoni elongata.*

L. punctulata (dotted). *cau.* stout, densely paleaceous at the crown. *sti.* 3in. to 6in. long, strong, erect. *barren fronds* oblong-lanceolate, 1ft. to 2ft. long, 4in. to 6in. broad; pinnæ very numerous, contiguous, linear, sub-falcate, 2in. to 3in. long, ¼in. to ⅜in. broad, rounded or cordate and auricled at base, lower ones deflexed, and the lowest reduced to auricles. *fertile fronds* similar, but pinnæ often not more than ⅛in. broad; rachis stout, erect, naked. South Africa, from Natal southward, and Java. Greenhouse.

L. rigida (rigid). A synonym of *L. dura.*

L. robusta (robust). A form of *L. Boryana.*

L. Spicant (spiked).* *rhiz.* stout, short-creeping. *barren fronds* on stalks 2in. to 3in. long, lanceolate, 6in. to 9in. long, 1in. to 1½in. broad, narrowed gradually below; pinnæ linear, ½in. to ¾in. long, ⅛in. broad, bluntish or mucronate, slightly dilated at the base. *fertile fronds* often 1ft. long, 2in. broad, on stipes 6in. to 9in. long, narrowly linear; pinnæ ⅛in. to ⅜in. apart, dilated at the base, the line of fructification at first slightly intramarginal. Northern hemisphere (Britain). Hardy. SYN. *Blechnum Spicant.*

Lomaria—*continued.*

L. S. anomala (anomalous). *fronds* about 9in. in height, thin, much attenuated; pinnæ all partially fertile, without being so much contracted as usual. Novel and distinct. A miniature form of this variety, known as *minus*, has been discovered in Wales, and makes a very pretty Wardian case subject.

L. S. concinna (neat). *barren fronds* prostrate, about 1ft. long, ¼in. broad; lobes almost flabellate, beautifully crenulated round the margins, and somewhat imbricated. *fertile fronds* similar in outline, but erect. A very pretty variety.

L. S. contracta (contracted). *fronds* 4in. to 6in. long, very narrow; the lower portion resembles a deeply incised wing to the rachis; the upper portion pinnatifid, becoming again narrow at the apex. North Wales. A pretty Wardian case plant.

L. S. crispa (curled). A beautiful variety, having the lobes of the fronds beautifully undulated or curled and nearly always entire, and all the apices crested.

L. S. cristata (crested). A pretty form, differing from the type in the apex of each frond having a furcate crest.

L. S. flabellata (fan-shaped). *fronds* several times divided near the base, each division being beautifully ramose, and crested at the apex. A handsome variety.

L. S. imbricata (imbricated). *barren fronds* 6in. long, 2in. broad, ovate-lanceolate, the obtuse lobes densely imbricated. *fertile fronds* with the lobes somewhat narrower.

L. S. imbricato-erecta (erect-imbricate). *fronds* ligulate; pinnæ imbricate, turning back in the fertile fronds, so that their edges almost meet. A distinct form of the variety *flabellata*.

L. S. lancifolia (lance-leaved). *barren fronds* narrow, depauperated at the base, entire and ligulate towards the apex. *fertile fronds* about 9in. long, pinnatifid; pinnæ short and obtuse, the terminal one very much elongated.

L. S. multifurcata (much-forked). *fronds* 5in. to 10in. in height, nearly 2in. broad, the apex divided into several branches, forming a head upwards of 3in. across; pinnæ usually furcate; sterile fronds prostrate; fertile ones erect.

L. S. polydactyla (many-fingered). A handsome form, nearly as large as the type, and bearing a beautiful crest upon the apex of every frond.

L. S. serrato-rigida (rigid-toothed). *fronds* 9in. to 10in. high, pinnate, crested upon the ends; pinnæ distant, serrated on both margins. A rigid and erect variety.

L. S. serrulata (serrulated). *fronds* about 6in. high, very narrow-lanceolate; pinnæ short, and beautifully serrulate on the margins. Very pretty for Wardian case culture.

L. S. stricta (upright). *fronds* about 1ft. high, 1in. broad; lobes dentate, often slightly depauperated; fertile fronds much narrower than the sterile ones. A distinct variety.

FIG. 467. LOMARIA SPICANT TRINERVIS CORONANS.

L. S. trinervis (three-nerved). The main point of distinction in this variety occurs in the division of the frond into three sections near the base, the lateral ones being very small in comparison to the central one. A fine form of this variety—*coronans*—has the apices terminated with a large crest. See Fig. 467.

L. S. variabilis (variable). *fronds* 4in. to 5in. long, simple, entire, for a third of their length enlarging upwards, and then suddenly contracting; apex sometimes furcate.

L. tenuifolia (slender-fronded). A synonym of *Acrostichum tenuifolium*.

L. tuberculata (warted). A synonym of *L. procera ornifolia*.

L. vestita (clothed). A synonym of *L. procera vestita*.

L. vulcanica (volcanic). *cau.* thick, erect or sub-prostrate, densely clothed at the crown with subulate blackish scales. *sti.* 4in. to 6in. long, erect. *fronds* 6in. to 18in. long, 3in. to 6in. broad,

Lomaria—*continued.*

the barren ones ovate-lanceolate, not narrowed at the base or the lower pinnæ abbreviated; pinnæ spreading, lanceolate, 2in. to 4in. long, ¼in. to ⅜in. broad, base slightly dilated, point acute or bluntish, the lowest pair deflexed; fertile pinnæ linear, distant, dilated suddenly at the base, 2in. to 4in. long, ⅛in. broad. Java, New Zealand, &c. Stove or greenhouse.

LOMARIDIUM. Included under **Lomaria** (which *see*).

LOMARIOPSIS. Included under **Lomaria** (which *see*).

LOMATIA (from *loma, lomatos*, an edge; referring to the winged edge of the seeds). SYN. *Tricondylus*. ORD. *Proteaceæ*. This genus comprises about nine species of greenhouse or conservatory shrubs or trees, six of which inhabit Australia, and the rest are natives of Chili. Flowers hermaphrodite, in pedicellate pairs, in terminal or axillary, simple or slightly-branched racemes; perianth irregular. Leaves alternate or rarely opposite, toothed or pinnately divided, very variable on the same plant. Lomatias thrive in a compost of loam, peat, and sand, in equal proportions. Plenty of drainage is most essential. Propagated by cuttings of well-ripened shoots, placed in gentle heat, under a bell glass. The undermentioned are very elegant foliage plants:

L. ferruginea (rusty).* *l.* very dark green on the upper side, bipinnatifid; pinnæ somewhat ovate, trifid at the points; petiole and back of the leaf clothed with a short tomentum. *h.* 10ft. Chili, 1851. A handsome plant, of graceful habit.

L. ilicifolia (Holly-leaved). *fl.*, racemes long and loose, simple or slightly branched. *l.* petiolate, ovate, oblong, or lanceolate, irregularly prickly-toothed or lobed. *h.* 6ft. Australia. An erect branching shrub, growing sometimes into a small tree. (B. M. 4023.)

L. silaifolia (Silaus-leaved).* *fl.* white, in long, erect racemes. *l.* bright green above, bipinnatifid, smooth; pinnæ lanceolate, irregularly cut, acute; under surface slightly glaucous, the reticulated veins prominent. *h.* 2ft. New South Wales, 1792. A very desirable species, having a spreading habit. (B. M. 1272.)

L. tinctoria (dyer's). *fl.*, racemes terminal, or in the upper axils, pedunculate, loose, 4in. to 8in. long. *l.* pinnate, bipinnate, or rarely undivided; segments linear, obtuse, entire or lobed. *h.* 2ft. Australia. A small shrub. (B. M. 4110.)

LOMATOPHYLLUM (from *loma, lomatos*, a border, and *phyllon*, a leaf; alluding to the distinctly-bordered leaves). SYN. *Phylloma*. ORD. *Liliaceæ*. A very small genus (two or three species) of greenhouse succulent plants, allied to *Aloe*. Flowers at the sides of the branches, racemose, shortly pedicellate; panicles in the axils of the superior leaves, pedunculate. Fruit subglobose, fleshy-coriaceous. Leaves clustered at the apices of the stems, loriform-elongated, fleshy-coriaceous; margin cartilaginous, often coloured, calloso- or spinuloso-serrulate. Stem woody, simple, sometimes tall. The under-mentioned is the only species in cultivation. For culture, *see* **Aloe.**

FIG. 468. LONAS INODORA, showing Habit, and (1) detached Flower-head, (2) Leaf, and (3) Single Floret (page 296).

Lomatophyllum—*continued.*

L. aloiflorum (Aloe-flowered). Bourbon Aloe. *fl.*, corolla yellow, suffused with brownish-red on the outside, about ¾in. long, as large as a quill in diameter. June. *l.* smooth, about 3ft. long, 2in. to 3in. broad, clear green. Stem (in old specimens) about 8ft. high, and nearly as thick as a man's thigh. Bourbon, 1766. (B. M. 1585, under name of *Phylloma aloiflorum.*)

LONAS (derivation unknown). ORD. *Compositæ.* A monotypic genus, the species being a hardy, erect, branched, glabrous, annual herb. It thrives in any ordinary garden soil. Propagated by seeds, which may be sown in the open ground, in spring.

L. inodora (inodorous). *fl.-heads* yellow, small, in dense, terminal, crowded corymbs; involucre sub-turbinate-campanulate; receptacle elongated; achenes glabrous. July to October. *l.* alternate, deeply-toothed or cut. *h.* 1ft. Barbary, 1686. See Fig. 468, page 295. (B. M. 2276, under name of *Athanasia annua.*)

LONCHITIS (a name given by Dioscorides to one of the orchids, from *lonche*, a lance; alluding to the shape of the fronds) ORD. *Filices.* A genus comprising two species of stove ferns. Sori marginal, placed in the sinuses of the frond, more or less distinctly reniform, but often considerably elongated; involucre of the same shape as the sorus, and covering it, membranous in texture, formed from the reflexed margin. For general culture, *see* **Ferns.**

L. pubescens (pubescent). *sti.* 1ft. to 2ft. long, strong, erect, densely clothed with woolly pubescence. *fronds* 2ft. to 4ft. long, deltoid, tripinnatifid, cut down to the rachis except towards the apex; lower pinnæ sometimes 1ft. to 1½ft. long, 9in. to 12in. broad; pinnules lanceolate, cut down nearly to the rachis below, with blunt, oblong, sinuated segments. *sori* placed round the main sinuses of the pinnules, and in two or three of the hollows of the segments on each side. Mauritius. The following are forms or synonyms of this species: *glabra*, *Lindeniana*, *madagascariensis*, and *natalensis.*

LONCHOCARPUS (from *lonche*, a lance, and *karpos*, a fruit; in allusion to the shape of the pods). ORD. *Leguminosæ.* An extensive genus (about fifty species have been described) of tall climbing shrubs or trees, for the most part natives of tropical America, a few inhabiting tropical Africa, and one a native of Australia. Flowers violet-purple or white, in simple racemes, or rarely paniculate. Leaves alternate, impari-pinnate; leaflets opposite, rarely stipellate. In all probability, the species here described is the only one yet introduced. It is a stove evergreen tree, requiring a compost of turfy loam and fibry peat, with a small quantity of sand added, to ensure perfect drainage. Propagated, in May or June, by half-ripened cuttings, placed in sand, under a bell glass, in a gentle heat.

L. roseus (rose-coloured). *fl.* rose, large, showy; pedicels one-flowered; racemes erect. *l.*, leaflets thirteen to fifteen, lanceolate, acuminated, glabrous, shining above, rather pale beneath. *h.* 20ft. South America, 1700.

LONDON PRIDE. *See* **Saxifraga umbrosa.**

LONGCHAMPIA. This genus is now included under **Leyssera** (which *see*).

LONICERA (named after Adam Lonicer, or Lonitzer, 1528-1586, a German botanist). Honeysuckle. Including *Caprifolium* and *Xylosteum.* ORD. *Caprifoliaceæ.* An extensive genus (about eighty species have been enumerated) of hardy or half-hardy, erect or twining, deciduous or evergreen shrubs, natives of the temperate and sub-tropical regions of the Northern hemisphere, rarely seen in the tropics. Flowers often fragrant, axillary or capitate, variously disposed; corolla tubular, campanulate or funnel-shaped, with usually an irregular limb. Leaves simple, opposite, stipulate. Loniceras are amongst the most beautifully scented and popular of flowering shrubs. The tall-growing sorts are best suited for covering walls, arbours, and trellises of any description. *L. fragrantissima* and *L. Standishii* produce their flowers in the greatest profusion early in spring, on the wood made and ripened the previous year. Pruning must not, therefore, be practised with these until flowering is past, when all the shoots should be shortened back nearly close. Almost all the other species flower on young wood. *L. sempervirens*, and its variety, *minor*, are beautiful plants for training up greenhouse rafters. The majority of the Loniceras are of easy culture in any good garden soil. Propagated readily by cuttings, also by layers, and sometimes by seeds.

Lonicera—*continued.*

L. brachypoda (short-stalked). A synonym of *L. flexuosa.*

L. cærulea (blue-berried). *fl.* greenish-yellow, tubular; peduncles short, two-flowered, reflexed in the fructiferous state. March and April. *fr.* a dark blue, elliptic or globose berry, covered with a kind of bloom. *l.* oval-oblong, ciliated, stiffish, densely pubescent while young. *h.* 3ft. to 5ft. Northern hemisphere, 1629. Erect, deciduous. (B. M. 1965.)

FIG. 469. FLOWERING BRANCHLET OF LONICERA CAPRIFOLIUM.

L. Caprifolium (goat's-leaf).* *fl.* yellowish, with a bluish tube, 2in. long, highly fragrant, ringent, terminal, disposed in capitate whorls. May and June. *fr.* of a tawny-orange colour, elliptical. *l.* obovate, acutish, glaucous; uppermost ones broader and connate. Stem twining from left to right. Europe (naturalised in England, &c.). Deciduous. See Fig. 469. (Sy. En. B. 641.)

L. chinensis (Chinese). A synonym of *L. japonica.*

L. ciliata (ciliate). *fl.* yellowish, bilabiate; corolla funnel-formed, almost spurred at the base; lobes nearly equal. May. Berries red, separate. *l.* oblong-ovate, often heart-shaped, petioled, thin, downy beneath. North America, 1824.

L. dioica (dicœcious). A synonym of *L. parviflora.*

L. diversifolia (different-leaved). A synonym of *L. quinquelocularis.*

L. Etrusca (Etruscan). *fl.* purplish on the outside, and yellow inside, fragrant, disposed in verticillate heads, usually about three heads on the top of each branch. May and June. *l.* obovate, obtuse, pubescent; lower ones on short petioles; upper ones connately perfoliate, acute. Branches twining. Europe. Deciduous.

L. flava (yellow).* *fl.* light yellow, fragrant, in approximate whorls; tube of the corolla somewhat gibbous. June. *l.* smooth, very pale and glaucous on both sides, thickish, obovate or oval, the

Lonicera—*continued.*

two to four, upper pairs united into round cup-like disks. North America, 1810. Twiner. (B. M. 1318.)

FIG. 470. FLOWERING BRANCH AND DETACHED FLOWERS OF LONICERA FLEXUOSA.

L. flexuosa (flexuous-stemmed).* *fl.* yellow, axillary, few, almost sessile, very fragrant. June and July. *fr.* globose, glabrous. *l.* ovate-oblong, acute, on short petioles, glabrous. Stems flexuous. *h.* 4ft. to 5ft. Japan, 1806. Deciduous twiner. SYN. *L. brachypoda.* See Fig. 470.

L. f. aurea-reticulata (golden-reticulated). *l.* beautifully netted or variegated with yellow, with a mixture of red towards autumn. An elegant plant.

L. fragrantissima (very fragrant).* *fl.* white, very fragrant, nearly 1in. across, produced before the leaves are developed; tube short; mouth expanded. February. *l.* oblong-obovate, acute, rounded at the base, nearly glabrous. *h.* 6ft. China, 1845. This most desirable erect evergreen species is one of the best fragrant winter-flowering plants cultivated. (L. & P. F. G. 3, 75, 268.) Closely allied to this species is *L. Standishii*, which has ovate-oblong, or ovate-lanceolate, ciliate leaves, and retrorsely hairy peduncles; in other respects, it is similar to *L. fragrantissima*, and is by no means inferior. (B. M. 5709.)

L. glauca (glaucous-leaved). *fl.* yellow; corolla long, tubular; tube slender; peduncles short; ovary free. July. *fr.*, berries globose. *l.* linear-oblong, obtuse; margins scaberulous, recurved, glaucous underneath. Western Himalayas. A dwarf, densely branched, wiry undershrub.

L. hirsuta (hairy). *fl.* yellow; spikes or racemes composed of verticillate heads of flowers; corolla beset with glandular pubescence. June and July. *l.* broad, ovate-elliptic, on short petioles, pubescent and ciliated, glaucous beneath; upper ones connately perfoliate. Branches twining. North America, 1822. Deciduous. SYNS. *Caprifolium hirsutum* and *L. pubescens.* (B. M. 3103.)

L. implexa (interwoven). *fl.* red, yellow, capitate, terminal. June to September. *l.* evergreen, leathery, oblong, entire, shining above, glaucous beneath. Plant glabrous. *h.* 8ft. Europe, 1772. Twiner. (B. M. 640.)

L. involucrata (involucrate). *fl.* yellow, tinged with red, viscid; peduncles axillary, two or three-flowered. June. *l.* ovate or oblong, somewhat acuminated, stiff, pubescent, tomentose on the nerves. Branches elongated, acutely tetragonal. *h.* 2ft. to 3ft. California, 1833. An erect species. SYN. *L. Ledebourii.* (B. R. 1179.)

L. japonica (Japanese). *fl.* red, villous on the outside and white within, about 1in. long, fragrant, twin. July to September. *l.* petiolate, ovate-acutish, villous, pale beneath; upper ones the smallest. Branchlets opposite, very hairy, bearing two leaves and two sessile flowers at the top of each. Stem twining, flexuous, hairy. Japan and China, 1806. (B. M. 3316, under name of *L. chinensis.*)

L. Ledebourii (Ledebour's). A synonym of *L. involucrata.*

L. longiflora (long-flowered). *fl.* at first snow-white, but finally changing to a golden-yellow, several inches long; peduncles short, two-flowered. July to September. *l.* petiolate, oblong-lanceolate, shining above and pale beneath. Branches twining. China, &c., 1826. Deciduous. (B. R. 1232, under name of *Caprifolium longiflorum.*)

L. parviflora (small-flowered). *fl.* in two or three closely approximate whorl, raised on a peduncle; corolla greenish-yellow, tinged with dull purple, gibbous at the base, smooth outside. May and June. *l.* smooth, oblong, green above, very glaucous beneath, the upper pairs united, all closely sessile. North America. Deciduous twiner. (B. R. 138, under name of *L. dioica.*)

Lonicera—*continued.*

L. p. Douglasii (Douglas's). *fl.*, corolla crimson or deep purple. *l.* greener than in the type, more or less downy underneath when young, or ciliate. North America.

L. Periclymenum (Periclymenum).* Woodbine, or Common Honeysuckle. *fl.* externally deep red, ringent, disposed in heads, all of which are terminal, ovate, and imbricated. Spring to autumn. *fr.* nearly globular, deep red, bitter and nauseous, accompanied by permanent bracts. *l.* ovate, obtuse, attenuated at the base, sometimes downy, glaucous. Branches climbing. Europe, &c. (Britain). Deciduous. (Sy. En. B. 642.) There are several varieties of this well-known shrub.

L. pubescens (downy). A synonym of *L. hirsuta.*

L. punicea (scarlet-flowered). *fl.* deep red or crimson; peduncles axillary and almost terminal, two-flowered, shorter than the leaves; tube of corolla rather gibbous at the base; segments unequal. April and May. *l.* ovate, sub-cordate at the base, sometimes three in a whorl on the young shoots. *h.* 2ft. to 4ft. Native country unknown, 1825. Erect. SYN. *Symphoricarpus puniceus.* (B. M. 2469.)

L. quinquelocularis (five-celled). *fl.* yellow, twin, sessile, axillary; lower lobe of corolla linear, recurved, trident; upper cordate. June and July. *l.* ovate, acute. *h.* 4ft. North India, 1840. Plant downy, erect. (B. R. 1844, 33, under name of *L. diversifolia.*)

FIG. 471. FLOWERING BRANCHLET OF LONICERA SEMPERVIRENS.

L. sempervirens (evergreen).* *fl.* of a beautiful scarlet outside and yellow inside, about 1in. long; spikes nearly naked, composed of whorls; tube of corolla ventricose on the upper side. Spring and summer. *l.* obovate or ovate, glaucous beneath, glabrous; upper ones connately perfoliate. Branches twining. North America, 1656. See Fig. 471. (B. M 781.) This evergreen species is the most handsome of all the cultivated Honeysuckles; it is best grown in a cool greenhouse. There is a very desirable variety, *minor.* (B. M. 1753.)

L. tatarica (Tartarian).* *fl.* rose-coloured, short, somewhat gibbous at the base; peduncles two-flowered, shorter than the leaves. April and May. *fr.* black, nearly globose when young, but at length connate at the base. *l.* cordate-ovate, hardly acute. *h.* 4ft. to 6ft. Tartary, 1752. Erect, deciduous. (B. R. 31.) There are several varieties of this species, differing principally in the colour of the flowers.

L. tomentella (slightly downy). *fl.*, corolla white, scarcely ½in. long; mouth equal; lobes short; throat villous. July. *fr.*, berry black. *l.* linear-oblong or lanceolate, obtuse or acute. Branches distichous, upright. *h.* 10ft. to 12ft. Sikkim-Himalayas, 1849. (B. M. 6486.)

L. Xylosteum (Xylosteum). Fly Honeysuckle. *fl.* cream-coloured, downy, small; peduncles two-flowered, shorter than the leaves. July. *fr.* oval, scarlet, one-celled, six-seeded. *l.* ovate, acute, petiolate, soft. *h.* 4ft. to 5ft. England. An erect deciduous shrub, of little beauty. SYN. *Xylosteum dumetorum.* (F. D. 308; Sy. En. B. 916.)

LONICEREÆ. A tribe of *Caprifoliaceæ.*

LOOKING-GLASS TREE. *See* **Heritiera.**

LOOSESTRIFE. *See* **Lysimachia** and **Lythrum.**

LOPADOCALYX. A synonym of **Olax** (which *see*).

LOPEZIA (named in honour of Thomas Lopez, a Spanish botanist, who wrote on the botany of America). SYN. *Pisaura.* ORD. *Onagrarieæ.* A genus (about twenty species have been described) of stove, greenhouse, or hardy erect annual herbs inhabiting Mexico and Guatemala. Flowers often small, racemose or subcorymbose, at the apices of the branches, remarkable in having but one antheriferous stamen and one petaloid. Leaves alternate, petiolate, lanceolate-acuminate, unequally serrate. Lopezias are of easy culture in a light soil. Propagated by seeds, sown on a slight hotbed, in the middle of March; the seedlings being transplanted to the open in the latter part of May.

L. coronata (crowned).* *fl.* rose-purple; petals reflexed, deeper coloured towards the base; racemes terminating the branches. July to September. *l.* alternate, ovate, serrated, attenuated at the base. *h.* 1½ft. Mexico, 1804. Hardy. (A. B. R. 551.)

L. grandiflora (large-flowered). *fl.* orange-red, disposed in close racemes; sepals erecto-patent; petals sessile. August. *l.* lanceolate, or ovate-acute, serrate, shortly stalked. *h.* 3ft. Mexico, 1879. Half-hardy.

L. macrophylla (large-leaved).* *fl.* bright red, large; calyx segments erecto-patent, lanceolate, broader at base; petals, two narrower and longer than calyx, geniculated at base, two broader and shorter; peduncles axillary, solitary, one-flowered. March. *l.* opposite, on long petioles, ovate-acuminate, serrated, slightly hairy and ciliated. Branches green and succulent. Mexico. A small half-shrubby greenhouse plant. (B. M. 4724.)

LOPHANTHUS (from *lophos*, a crest, and *anthos*, a flower; in allusion to the crenated or crested middle lobe of lower lip of corolla). Giant Hyssop. ORD. *Labiatæ.* A genus comprising six species of hardy or half-hardy erect herbs, with the habit of *Nepeta*, natives of North America and extra-tropical Eastern Asia. Corolla blue or purplish; tube as long as the calyx, or shortly exserted; limb two-lipped; whorls many-flowered, sometimes densely crowded in terminal spikes, sometimes in axillary cymes. Nutlets ovoid, smooth. Leaves toothed; floral ones often reduced to short ovate and acuminate bracts. The undermentioned species are hardy perennials, and grow well in ordinary soil. Propagated by divisions. All the plants here described are North American.

L. anisatus (Anise-scented).* Anise Hyssop. *fl.* blue; calyx teeth lanceolate, acute. July. *l.* ovate, acute, glaucous, white with minute down underneath, scented like Anise. *h.* 3ft. 1826. (B. R. 1282.)

L. nepetoides (Nepeta-like). *fl.*, corolla pale greenish-yellow; calyx teeth ovate, rather obtuse, little shorter than the corolla; spikes 2in. to 6in. long, crowded with bracts. July. *l.* ovate, somewhat pointed, coarsely crenate-toothed, 2in. to 4in. long. Stem stout, 4ft. to 6ft. high, sharply four-angled. 1692.

L. scrophulariæfolius (Figwort-leaved).* *fl.*, corolla purplish; calyx teeth lanceolate, acute, shorter than the corolla; spikes 4in. to 15in. long. July. *l.* ovate or somewhat cordate, acute; lower surface, as well as the stem, more or less pubescent. *h.* 5ft. 1800.

L. urticifolius (Urtica-leaved). *fl.* purplish, or white and pink, with much-exserted stamens; spikes dense, oblong, 2in. to 3in. long. Late summer. *l.* cordate-ovate, crenated, stalked. Stem square, branched. *h.* 3ft. to 4ft. 1826.

LOPHIDIUM. *See* **Schizæa.**

LOPHIOLA (a diminutive name, deduced from *lophos*, a crest; referring to the crested sepals). ORD. *Hæmodoraceæ.* A monotypic genus, the species being a pretty, slender, hardy, herbaceous perennial, requiring peaty soil, and a rather damp, shady situation. Propagated by divisions of the root, in autumn or spring.

L. aurea (golden). *fl.* yellow, densely woolly on the outside, disposed in a crowded cyme at the top of a naked scape; perianth deeply six-cleft, with spreading divisions. June. *l.* narrow-equitant, radical. *h.* 1½ft. North America, 1811. (B. M. 1596.)

LOPHIRA (from *lophos*, a crest, and *eiro*, to arrange; in reference to one of the sepals being extended out into a ligulate wing or crest). ORD. *Dipterocarpeæ.* A monotypic genus, the species being a handsome stove pyramidal tree. It requires a compost of sandy loam and fibry peat. Firm young cuttings will root in sand, in a gentle bottom heat.

Lophira—*continued.*

L. africana (African). Scrubby Oak. *fl.* yellow, in terminal and axillary racemes. February. *fr.* one-celled, indehiscent, fleshy, soft. *l.* elongated, entire, often undulated, emarginate, leathery, pale green; stipules caducous. *h.* 10ft. Tropical Western Africa, 1822.

LOPHOLEPIS. *See* **Polypodium.**

LOPHOSORUS. Included under *Alsophila.*

LOPHOSPERMUM. Included under **Maurandia** (which *see*).

LOPHYRUS (*Pine Sawflies*). A genus of Sawflies, the larvæ of which feed on Fir, Spruce, Larch, and other conifers. Several species are known to occur in Britain. At times, the larvæ do extensive damage, as they are of social habit, and eat away the needles, so that they leave branches, or even whole trees, bare; they may thus destroy entire plantations. They are seldom hurtful in gardens, however, being restricted to conifers, and do not need to be described at length in this work. Owing to their living and feeding in society, their presence is easily detected, and hand-picking will, in almost all cases, be found an effectual remedy, should they attack conifers in gardens or in pleasure grounds.

LOPIMIA. Now included under **Pavonia** (which *see*).

LOQUAT, or JAPAN QUINCE. *See* **Photinia japonica.**

LORANTHACEÆ. An order of evergreen shrubs, parasitic on the wood of other Dicotyledons, sometimes appearing epiphytal, and emitting roots, which creep over the branches of the infested tree. Flowers sometimes imperfect, small, inconspicuous, whitish or greenish; sometimes perfect, brightly coloured, variously arranged. Leaves opposite, rarely alternate or whorled, thick, coriaceous, entire. Loranthaceæ are mostly tropical, but some inhabit temperate and cool regions of the Northern and Southern temperate latitudes. The fruit of this order contains Birdlime, a peculiar viscous, tenacious, and elastic substance. Mistletoe (*Viscum album*) was formerly worshipped by the Gauls; it was also held sacred by the Druids. There are about thirteen genera and 500 species. Examples: *Loranthus, Viscum.*

LORATE. Shaped like a thong or strap.

LORD ANSON'S PEA. *See* **Lathyrus magellanicus.**

LORD HARRINGTON'S YEW. *See* **Cephalotaxus pedunculata.**

LORDS AND LADIES. *See* **Arum maculatum.**

LOREYA (named after M. Lorey, a French botanist, author of a Flora of Burgundy, published in 1825). ORD. *Melastomaceæ.* A small genus (about eight species have been described) of ornamental, glabrous or tomentose, stove trees, natives of Northern Brazil and Guiana. Flowers in cymose panicles. Fruit inferior, baccate. Leaves large, stalked, ovate, entire. Branches four-sided. Probably the species here described is the only one yet introduced. For culture, *see* **Melastoma.**

L. arborescens (tree-like). *fl.* white, lateral: racemules seven to eight-flowered, cymose. July. *fr.*, berry yellow, edible, very like a medlar. *l.* petiolate, oval-orbicular, obtuse, or mucronate. *h.* 30ft. Guiana, 1822.

LORINSERIA. *See* **Woodwardia.**

LOROPETALUM (from *loron*, a thong, and *petalon*, a petal; referring to the long thong-like petals). ORD. *Hamamelideæ.* A monotypic genus, the species being a very ornamental, free-flowering, hardy, stellate-tomentose shrub, or small tree. It thrives in any light rich soil. Propagated by seeds, or by cuttings.

L. chinense (Chinese). *fl.* white, small, disposed in terminal, crowded, six to eight-flowered heads; petals four, linear-elongated. Autumn. *l.* dark green, alternate, persistent, oblong, entire, nerved beneath; stipules membranaceous, deciduous. *h.* 4ft. Khasia Mountains and China, 1880.

LOTUS (from *Lotos*, the old Greek name given by Theophrastus and Dioscorides to some leguminous plants). Bird's-foot Trefoil. Including *Pedrosia* and *Tetragonolobus*. ORD. *Leguminosæ*. A large genus (about 100 species have been described, although not more than fifty have any claim to specific rank) of greenhouse or hardy herbs or sub-shrubs, widely dispersed over the temperate regions of the Northern hemisphere in the Old World, the mountains of tropical Asia, and extra-tropical South Africa. Flowers yellow, red, purple, pink, or white, usually several together in an umbel, on an axillary peduncle. Leaves four or five-folioiate; leaflets entire. But few species are worth growing, and these are of very easy culture in almost any ordinary garden soil. *L. jacobæus* is a greenhouse sub-shrubby plant, but it is very liable to die off in winter. It can be increased, during early summer, by cuttings, placed in an airy situation, and kept carefully watered. The species can also be raised annually from seeds, which are ripened freely in this country. *L. gebelia* and *L. jacobæus* would probably prove hardy in the open air, if planted in a warm, sheltered spot.

L. albidus (whitish). A synonym of *L. australis*.

L. australis (Southern).* *fl.* usually pink, but varying from white to a purple-red. July. *l.*, leaflets narrower than in *L. corniculatus*, and the stipulary ones dissimilar, but varying from obovate to linear. Stems diffuse, ascending, or erect. *h.* 2ft. Australia. Greenhouse perennial. (B. M. 1353.) SYN. *L. albidus* (L. B. C. 1063).

L. corniculatus (small-horned).* Common Bird's-foot Trefoil. *fl.* bright yellow, fading to an orange-colour; vexillum striped with red at the base in front; peduncles very long, each bearing three, four, five, or ten flowers at the apex in a kind of flat umbel. Summer and autumn. *l.*, leaflets obovate, acute, entire; stipules ovate. Northern hemisphere (Britain). Plant procumbent. A very handsome dwarf herbaceous plant, well suited for growing on a rockwork. (Sy. En. B. 368.) The double-flowered form is very desirable.

L. gebelia (Gebel-cher).* *fl.* at first red, but ultimately pale rose, large; heads of long peduncles usually three-flowered. June and July. *l.*, leaflets and stipules ovate, rather glaucescent. Stems decumbent. Asia Minor, 1816. Greenhouse perennial.

FIG. 472. LOTUS JACOBÆUS, showing Flowering Branch, detached Portion of Stem, with Leaf and Flowers (natural size), and Pods.

L. jacobæus (St. Jago).* *fl.* dark purple, almost black, with the vexillum yellowish, corymbose; peduncles longer than the leaves. Summer and autumn. *l.*, leaflets and stipules linear or linear-spathulate, rather pilose and canescent, mucronate. *h.* 1ft. to 3ft. Cape Verde Islands. Greenhouse perennial. See Fig. 472. (B. M. 79.)

L. peliorhynchus (pigeon's-beak).* *fl.* loosely crowded on short shoots towards the ends of the branches; corolla scarlet, 1in. long, with a very narrow-lanceolate standard, sharply recurved, like a hood. May. *l.* crowded, sessile, having subulate, spreading leaflets (as if fascicled). *h.* 2ft. Teneriffe, 1884. A singular and ornamental greenhouse shrub. (B. M. 6733.)

L. pinnatus (pinnate). A synonym of *Hosackia bicolor*.

L. Tetragonolobus (Tetragonolobus). *fl.* dark purple, solitary or twin; bracts longer than the calyx. June to August. *l.*, leaflets obovate, entire; stipules ovate. *h.* 6in. to 12in. South Europe. Hardy annual. SYN. *Tetragonolobus purpurea*. (B. M. 151.)

LOTUS-TREE, EUROPEAN. *See* **Diospyros Lotus.**

LOTZEA. Included under *Asplenium*.

LOUSEWORT. *See* **Pedicularis.**

LOVAGE. *See* **Ligusticum scoticum.**

LOVE APPLE. *See* **Lycopersicum.**

LOVE GRASS. *See* **Eragrostis.**

LOVE-IN-A-MIST. *See* **Nigella damascena, N. sativa,** &c.

LOVE-IN-IDLENESS. *See* **Viola tricolor.**

LOVE-LIES-BLEEDING. *See* **Amaranthus caudatus.**

LOVE-TREE. *See* **Cercis Siliquastrum.**

LOWEA. Included under **Rosa** (which *see*).

LOXANTHES. A synonym of **Nerine** (which *see*).

LOXOCOCCUS (from *loxos*, oblique, and *kokkos*, a berry; fruit oblique). ORD. *Palmæ*. A monotypic genus, the species being an elegant stove Palm, which flowered, for the first time in England, at Kew, in the spring of 1878. For culture, *see* **Areca.**

L. rupicola (rock-loving).* *fl.* and spathe blood-red; inflorescence produced from the upper part of the stem beneath the leaves. *l.* pinnate, spreading, 5ft. to 6ft. long, 3ft. to 4ft. broad; petioles 1½ft. long, with a green, smooth, shortly amplexicaul base; pinnules from twelve to twenty pairs, spreading, and somewhat recurved. *h.* 30ft. to 40ft. Ceylon, 1878. SYN. *Ptychosperma rupicola*. (B. M. 6358.)

LOXOSCAPHE. Included under **Davallia** (which *see*).

LOXSOMA (from *loxos*, oblique, and *soma*, a body; the sporangia are girt by an incomplete ring). ORD. *Filices*. A monotypic genus, the species being a remarkable and rare greenhouse fern. For culture, *see* **Ferns.**

L. Cunninghami (Cunningham's). *cau.* long, stout, creeping. *fronds* long-stipitate, coriaceous, decompound, glaucous beneath, 1ft. to 1½ft. high. *sori* marginal, in the sinus of the teeth or lobes, terminating a vein, declined; involucre sub-urceolate, coriaceous, the mouth truncated, entire; receptacle elongated, much exserted, clothed to the apex with stipitate capsules (mixed with jointed hairs), which have a short, broad, incomplete oblique ring, opening vertically. New Zealand. (H. G. F. 31.)

LUBINIA. Included under **Lysimachia** (which *see*).

LUCANUS CERVUS, or STAG BEETLE. This is the largest of British beetles, and the male (see Fig. 473) is so strikingly distinguished by the enormously developed jaws, that it could not be mistaken for any other insect. Large individuals are as much as 3in. long, including the jaws; but they vary greatly in size of body, and in length of jaws, the smaller males not exceeding half the above size. The female is somewhat smaller than the male, but is like the latter, except in having short, sharp jaws, on a correspondingly smaller head. The head, thorax, and legs are black; the jaws and wing-covers (elytra) are deep chestnut-brown, with black margins. The beetles feed on the juices of twigs and leaves, which they bruise with their strong jaws. They appear fond of sugary solutions. The female lays her eggs in dead, or dying, trunks and branches of Oaks or Willows; and in them the larvæ live, feeding for three or four years. Though preferring rotten material, they may also eat into the living wood, and thus do considerable damage. The cocoons are made of chips of wood in the tree; and from them the beetles emerge when mature. Stag Beetles are frequently plentiful, *e.g.*, in Kent, but are local, and do not occur in the North of England or in Scotland. A nearly related, but smaller insect—the Small Stag Beetle, *Dorcus parallelopipedus* (see Fig. 474)—often lives along with *Lucanus cervus*, and is of the same habits. It also is

Lucanus cervus, or **Stag Beetle**—*continued.*

FIG. 473. MALE STAG BEETLE (LUCANUS CERVUS).

common in the South of England. Neither insect does much injury to quite healthy trees, because of the preference of the larvæ for decaying wood.

FIG. 474. SMALL STAG BEETLE (DORCUS PARALLELOPIPEDUS).

LUCINÆA. A synonym of **Anchietea** (which *see*).

LUCULIA (from *Luculi Swa*, its native name). ORD. *Rubiaceæ*. A genus comprising two species of very ornamental and fragrant-flowered greenhouse evergreen shrubs, the one from the Himalayas, the other from the Mountains of Khasia. The best-known and most generally cultivated species is *L. gratissima*. This is a very handsome plant, amenable to pot culture, but it thrives best in the beds or borders of a conservatory where plenty of room can be afforded. It succeeds in a compost of fibrous loam, peat, and silver sand. The roots should be inclosed in an area of about 3ft. square, with thick slates or a narrow wall, and they must not be disturbed after planting time. Large quantities of water may be applied throughout the summer, but none should be given between the pruning time in December, and April, the season for starting. Old-established plants may be cut hard back when the flowers have faded, as the new growths bear flowers the next autumn on their points. Propagation may be effected by imported seeds, which germinate freely if sown in sandy soil, and placed in a little heat, during spring or summer. The method of increase usually recommended is that of inserting cuttings of young shoots, about Midsummer, under a bell glass, subjecting them for the first two or three weeks to a gentle bottom heat. Although it is possible to propagate Luculias from cuttings, it is by no means a generally successful

Luculia—*continued.*

method, unless the conditions under which the cuttings are placed regarding shade and temperature, are just suitable to their requirements. Seedling plants grow fast, if properly attended to, but seldom bear flowers before the second or third year.

FIG. 475. FLOWERING BRANCH OF LUCULIA GRATISSIMA.

L. gratissima (very grateful).* *fl.* rose-coloured, somewhat fleshy, sweet-scented; corolla tubular; cymes terminal, many-flowered. Autumn. *l.* elliptic, acuminated, glabrous above, villous on the veins beneath. Branches terete, pubescent. *h.* 9ft. to 16ft. Temperate Himalayas, 1823. See Fig. 475. (B. M. 3946; S. B. F. G. 145.)

FIG. 476. FLOWERING BRANCH OF LUCULIA PINCEANA.

L. Pinceana (Pince's).* *fl.* white, larger and more fragrant than the above species. May to September. Khasia Mountains, 1843. This plant resembles *L. gratissima* in general habit, but has smaller, narrower, more coriaceous leaves, with more numerous nerves, and quite glabrous. The best character, however, to distinguish between the two species is the presence in *L. Pinceana* of a raised callus on each side of the sinus of the corolla lobes. See Fig. 476. (B. M. 4132.)

LUCUMA (the Peruvian name of one of the species). Syns. *Guapeba*, *Sersalisia* (in part), *Vitellaria*. Ord. *Sapotaceæ*. A genus of about sixty species of lactescent stove trees and shrubs, mostly natives of South America, extending from Chili and Peru to Mexico and the West Indies, a few Australian or New Caledonian. Flowers produced in clusters upon the sides of the branches. Fruit large, fleshy, edible, somewhat egg-shaped, 3in. to 5in. long, covered with a rusty skin. Leaves scattered, leathery, entire. Probably *L. mammosa* is the only species in cultivation. For culture, *see* **Chrysophyllum.**

L. mammosa (nipped). Marmalade Plum. *fl.* small, whitish, solitary. *fr.* large, oval or top-shaped, covered with a brownish rough skin, under which is a soft pulp, of a russet-colour, and very luscious. *l.* obovate-lanceolate and oblong, 1ft. to 2ft. long, cuspidate, glabrous. *h.* 50ft. to 100ft. South America, 1739.

LUDDEMANNIA LEHMANNI. *See* **Cycnoches Lehmanni.**

LUDIA (from *ludus*, a game, sport; in allusion to the sportive and variable shapes of the leaves). Ord. *Bixineæ*. A monotypic genus, the species being an evergreen stove shrub, native of the Mauritius, &c. It thrives in a compost of loam, peat, and sand. Propagated by cuttings, made of half-ripened shoots, and inserted in sand, under a bell glass, in bottom heat.

L. sessiliflora (sessile-flowered). *fl.*, axillary, sessile, or shortly pedicellate, calyx whitish; anthers yellow; sepals deflexed. July and August. *l.* variable, oblong or lanceolate, rigidly coriaceous, shining, acutish. *h.* 8ft. to 12ft. 1820. *L. heterophylla* is a form with abnormal leaves, some entire and obovate, others spinose-dentate.

LUDISIA. A synonym of **Hæmaria** (which *see*).

LUDOVIA. A synonym of **Carludovica** (which *see*).

LUFFA (*Louff* is the Arabic name of *L. ægyptiaca*). Ord. *Cucurbitaceæ*. A genus comprising about half-a-score species of glabrous, scabrous, or pubescent, stove, annual herbs, natives of the warm regions of the globe, one being indigenous to America. Flowers white, rather large, monœcious; racemes of the male flowers long-peduncled; female flowers solitary. Fruit oblong or cylindrical, smooth or prickly, fibrous within and containing many seeds. Leaves five to seven-lobed; petioles eglandulose at apex; tendrils twice or many-fid. Some of the gourds of this genus possess a very disagreeable odour. For culture, &c., *see* **Gourds.**

L. acutangula (acute-angled). *fl.* bright yellow. September. *l.* cordate, five to seven-angled, the angles acute, toothed. Stem sulcate. Tropical Africa, &c. (B. M. 1638, under name of *L. fœtida*.)

L. fœtida (stinking). A synonym of *L. acutangula*.

LUHEA (named after C. Van de Luhe, a German botanist, who wrote on the plants of the Cape of Good Hope at the end of the eighteenth century). Syn. *Alegria*. Ord. *Tiliaceæ*. A small genus (about sixteen species) of handsome stove trees, allied to *Sparmannia*, confined to the tropical parts of the New World. Flowers white or pink, showy, in axillary cymes or in terminal panicles. Leaves often dentate, stellate-tomentose underneath, on short footstalks. The species thrive in a compost of fibry peat and sandy loam. Propagated by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in bottom heat. Probably the species here described is the only one yet introduced.

L. paniculata (panicled). *fl.* rosy-white; cymes at the tips of the branches disposed in a large leafy panicle. March and April. *l.* broad-ovate, bluntish or acutish, cordate at the base, unequally serrate. *h.* 10ft. to 20ft. Brazil, 1823.

LUISIA (said to be called after a Spanish botanist, Don Luis de Torres). Syns. *Birchea* and *Mesoclastes*. Ord. *Orchideæ*. A genus comprising about ten species of stove epiphytal orchids, natives of the East Indies and Eastern Asia, extending from the Malayan Archipelago to Japan. The species have lateral spikes of dingy green, purplish, or yellowish, sub-sessile flowers. Leaves terete, rigid, rush-like. Stems erect. Two or three species

Luisia—*continued.*

are in cultivation; they thrive on a block of wood, with sphagnum, and require a moist atmosphere in the summer, when in a growing state. Propagated by divisions.

L. alpina (alpine). A synonym of *Vanda alpina*.

L. macrotis (long-eared). *fl.* yellowish-green, with a wholly violaceous lip. Assam, 1869.

L. macrotis (long-eared). *fl.* yellowish-green, with a wholly violaceous lip. Assam, 1869.

L. microptera (small-winged). *fl.* straw-colour, small, racemose; lip half purplish, half yellow. Assam, 1870.

L. platyglossa (broad-lipped).* *fl.* dull dirty-purple, or with white sepals and petals; racemes few-flowered; petals equalling, or longer than, dorsal sepals; lateral sepals keeled; lip convex, oblong, rotundate at base. Khasia. A stout species, sometimes with an enormous development of downy roots. (B. M. 3648, under name of *Cymbidium triste*.)

L. Psyche (Psyche). *fl.* curiously marked, axillary, solitary; petals yellowish-green; lip reticulated with violet-purple. *l.* quill-like, about 6in. long. Stems erect, terete. Burmah, 1865. (B. M. 5558.)

LUNARIA (from *luna*, the moon; referring to the shape of the seed-vessels). Honesty. Ord. *Cruciferæ*. A genus comprising two species of very ornamental, hardy, annual, biennial, or perennial herbs, natives of Europe and Western Asia. Flowers lilac, large, ebracteate; racemes terminal. Siliquas stipitate, broadly elliptic or oblong, compressed. Leaves petiolate, entire, cordate. Both species are well worth a place in any garden, and thrive best in a somewhat sandy soil. Increased by seeds, or by divisions.

Fig. 477. Flowering Stem of Lunaria annua.

L. annua (annual).* *fl.* violet-lilac, scentless. May to July. Pods elliptical, blunt at both ends. *l.* cordate. *h.* 1½ft. to 3ft. Sweden, &c., 1595. A well-known and handsome annual or biennial. Syn. *L. biennis*. See Fig. 477. There are two or three varieties.

L. biennis (biennial). A synonym of *L. annua*.

L. rediviva (revived). *fl.* purplish, fragrant. May and June. Pods lanceolate, narrowed at both ends. *h.* 2ft. to 3ft. 1596. A perennial, not so pretty as *L. annua*, with smaller, scented flowers.

LUNATE, LUNULATE. Half-moon-shaped.

LUNGWORT. *See* **Pulmonaria.**

LUPINE. *See* **Lupinus.**

LUPINUS (the old Latin name used by Virgil and Pliny; said to be derived from *lupus*, a wolf; on account of the plant being supposed to destroy the fertility of the soil). Lupine. ORD. *Leguminosæ*. Of this genus over eighty species have been described, but some of them are very variable in our gardens. They are mostly hardy or half-hardy annual or perennial herbs and sub-shrubs, rarely shrubs, numerously dispersed in America, especially in the West, but rarer within the tropics, except in mountainous regions. In the Old World, the genus is represented only by a few annuals in the countries near the Mediterranean. Flowers blue, purplish, or variegated, rarely yellow or white, in sparse terminal racemes or in approximate whorls, often very handsome; calyx deeply two-lobed. Pods very frequently silky-villose, two-valved. Leaves simple, or digitately five to fifteen or many-foliolate, rarely trifoliolate; stipules adnate to the base of the petiole. All the Lupines are of very easy cultivation in moderately good garden soil. The seeds of the annuals, which are among the most ornamental of summer-flowering plants, may be sown, in the open border, during April or May. The perennials may be increased by seeds, in the same manner as the annuals; or by dividing the stronger-growing plants, during March or April. Comparatively few true species are seen in cultivation, as they are almost superseded by the numerous and beautiful hybrids. There is scarcely a single species of this large genus which can be considered as worthless in a flower-garden. Those described below are hardy, unless otherwise specified.

L. affinis (allied). *fl.* deep blue. June. *h.* 9in. California, 1848. Perennial.

L. albifrons (white-herbaged). A synonym of *L. Chamissonis*.

L. arboreus (tree).* Tree Lupine. *fl.* yellow, fragrant, somewhat verticillate, pedicellate. Summer. *l.*, leaflets lanceolate-linear, acute, pubescent beneath. North America, 1793. Plant shrubby. (B. M. 682; B. R. xxiv., 32.)

L. arbustus (shrub-like). A synonym of *L. laxiflorus*.

L. aridus (arid). *fl.* purplish-blue; upper lip of calyx bifid, lower one entire. August and September. *l.*, leaflets linear-lanceolate, villous. *h.* 1ft. North America, 1827. Perennial. (B. R. 1242.)

FIG. 478. LUPINUS (MUTABILIS) CRUIKSHANKII, showing Habit and detached Portion of Inflorescence.

L. bimaculatus (two-spotted). A synonym of *L. subcarnosus*.

L. Chamissonis (Chamisso's). *fl.* blue, verticillate, in long, slender racemes. September. *l.*, leaflets obovate-oblong, narrowed at the base. Stem and leaves clothed with silvery-silky down. *h.* 3½ft. California, 1833. Perennial. SYN. *L. albifrons* (B. R. 1642).

L. grandifolius (large-leaved). A synonym of *L. polyphyllus*.

L. laxiflorus (loose-flowered). *fl.* with the vexillum and tips of the wings blue, but the keel and base of the wings reddish; calyx entire, saccate at the base, upper lip bifid, lower one longer, ovate, and acuminated. August and September. *l.*, leaflets linear-lanceolate. *h.* 1ft. to 1½ft. North America, 1826. Perennial. (B. R. 1140.) SYN. *L. arbustus* (B. R. 1230).

L. lepidus (charming).* *fl.* with the vexillum purplish-blue inside, with a white spot at the base, and pale outside; wings purplish-blue; keel dark purple at the apex. August and September. *l.*, leaflets lanceolate, silky on both surfaces. *h.* 6in. North America, 1826. Perennial. (B. R. 1149; L. B. C. 1980.)

L. leptophyllus (slender-leaved). *fl.* violaceous, disposed in loose pedunculate racemes, somewhat verticillate; calyx pubescent, with both lips entire, and about equal in length, the upper one broadest. *l.*, leaflets linear, acute, with a few silky hairs on both surfaces. *h.* 1ft. to 3ft. Mexico. Perennial.

L. leucophyllus (white-leaved).* *fl.* pink, alternate, pedicellate, bracteolate, disposed in long racemes. June to November. *l.*, leaflets seven to nine, oblong-lanceolate; stipules subulate, woolly. *h.* 2ft. to 3ft. North America, 1826. Plant very villous. Perennial. (B. R. 1124.) SYN. *L. plumosus* (B. R. 1217).

FIG. 479. FLOWERING BRANCH OF LUPINUS NANUS.

L. littoralis (seashore-loving). *fl.* purplish-blue; both lips of calyx entire. June to October. *l.*, leaflets five to seven, linear-spathulate, silky on both surfaces. *h.* 1ft. North America, 1826. Perennial. (B. M. 2952; B. R. 1198.) SYNS. *L. nootkatensis fruticosus* (B. M. 2136), and *L. versicolor* (B. R. 1979).

L. luteus (yellow).* *fl.* yellow, fragrant, verticillate, sessile, bracteolate. June to August. *l.*, leaflets seven to nine, oblong, lower ones obovate. *h.* 1ft. to 1½ft. South Europe, &c., 1596. Annual. SYN. *L. odoratus*. (B. M. 140.)

FIG. 480. LUPINUS NOOTKATENSIS, showing Habit, detached Flower, and small Leaf.

L. macrophyllus (large-leaved). A synonym of *L. polyphyllus*.

L. microcarpus (small-fruited). *fl.* blue; whorls about six-flowered; calyx without appendage; upper lip emarginate, lower bifid. April. *l.*, leaflets nine or ten, lanceolate, hairy on under surface, smooth on upper. *h.* 1½ft. North America. Annual. (B. M. 2413.)

L. mutabilis (changeable).* *fl.* large, somewhat verticillate; the vexillum white, mixed with blue, changing to blue, with a large yellow mark in the centre; wings white, faintly striated; keel white. June to August. *l.*, leaflets seven to nine, glaucescent and rather pubescent beneath, lanceolate, bluntish. *h.* 5ft. South America, 1819. A handsome, half-hardy, erect, branched

Lupinus—*continued.*

sub-shrub. (B. M. 2682; B. R. 1539.) *L. Cruikshankii* is considered by some authors to be but a variety of this species. See Fig. 478. (B. M. 3056.)

L. nanus (dwarf).* Common Dwarf Lupine. *fl.* lilac and blue. Summer. *l.* with five to seven narrow-lanceolate, acute, hairy leaflets. *h.* 1ft. California, 1833. Annual. See Fig. 479. (B. R. 1705; S. B. F. G. ser. ii. 257.)

L. nootkatensis (Nootka Sound).* *fl.* blue, mixed with purple, white, or yellow, and streaked with more intense veins, rather verticillate, pedicellate. May to July. *l.*, leaflets seven or eight, obovate, lanceolate, hairy. *h.* 1ft. to 1½ft. Nootka Sound, 1794. Perennial. See Fig. 480. (B. M. 1311; L. B. C. 879.)

FIG. 481. INFLORESCENCE AND UPPER LEAVES OF LUPINUS POLYPHYLLUS.

L. n. fruticosus (shrubby). A synonym of *L. littoralis.*

L. odoratus (sweet-scented). A synonym of *L. luteus.*

L. ornatus (adorned).* *fl.* with a pale vexillum, blue wings, and a ciliated paler keel, rather large; upper lip of calyx bifid, lower one entire and elongated. May to November. *l.* linear-lanceolate, clothed with silvery silky down on both surfaces. *h.* 1ft. to 2ft. North America, 1826. Perennial. (B. R. 1216; S. B. F. G. ser. ii. 212.)

L. perennis (perennial).* *fl.* blue; calyx alternate, without appendage; upper lip emarginate, lower entire. May to July. *h.* 2ft. North America, 1658. Perennial. (B. M. 202.)

L. pilosus (shaggy). *fl.* rose, middle of the vexillum red, verticillate, pedicellate, bracteolate. July and August. *l.* nine to eleven, oblong-lanceolate, villous on both surfaces as well as the stem. *h.* 2ft. to 4ft. South Europe, 1710. Annual.

Lupinus—*continued.*

L. plumosus (feathery). A synonym of *L. leucophyllus.*

L. polyphyllus (many-leaved).* *fl.* usually dark blue, rather verticillate, pedicellate. Spring and autumn. *l.*, leaflets eleven to fifteen, lanceolate, hairy beneath. *h.* 4ft. Columbia, 1826. A well-known perennial, the commonest and one of the best. See Fig. 481. SYNS. *L. grandifolius, L. macrophyllus.* (B. R. 1096, 1377; S. B. F. G. ser. ii. 356.)

L. Sabinianus (Sabine's). A synonym of *L. Sabinii.*

L. Sabinii (Sabine's). *fl.* yellow; wings roundish, size of standard; calyx villous, with the upper lip ovate and acute, lower one boat-shaped, revolute. May and June. *l.*, leaflets seven to twelve, lanceolate, acuminated, silky. *h.* 2ft. to 3ft. North America, 1827. Perennial. SYN. *L. Sabinianus.* (B. R. 1435.)

L. subcarnosus (nearly fleshy-leaved).* *fl.* deep rich blue, with a yellowish blotch in the lower part of the standard, lower lip of calyx entire. July. *l.* on long petioles, of five obovate-lanceolate, thick, almost fleshy, retuse leaflets, those of the lower leaves shortest and broadest. Stem downy. *h.* 1ft. Texas, 1835. Perennial. (B. M. 3467.) SYNS. *L. bimaculatus* (S. B. F. G. ser. ii. 314), *L. texensis* (B. M. 3492).

L. texensis (Texan). A synonym of *L. subcarnosus.*

L. tomentosus (tomentose). *fl.* large, variously coloured, and combinations of different colours, verticillate, pedicellate. Summer. *l.*, leaflets eight to ten, oblong, bluntish, mucronulate, tapering to the base. *h.* 4ft. to 5ft. Peru, 1825. A very handsome half-hardy shrub, clothed in every part with silky tomentum.

L. varius (variable). *fl.* usually dark blue, large, somewhat verticillate or alternate, pedicellate. July and August. *l.*, leaflets oblong-lanceolate, villous beneath, usually five or six in number. *h.* 2ft. to 3ft. Spain, &c., 1596. Annual.

L. versicolor (various-coloured). A synonym of *L. littoralis.*

LUSSACIA. A synonym of **Gaylussacia** (which *see*).

LUXEMBURGIA (named after a Duke of Luxembourg, under whose auspices M. Auguste St. Hilaire commenced his voyage to Brazil). SYN. *Plectranthera.* ORD. *Ochnaceæ.* A genus comprising seven species of showy, branched, very glabrous, stove trees or shrubs, natives of Brazil. Flowers yellow, disposed in terminal racemes. Leaves alternate, toothed, mucronate, oblong, finely veined. The species thrive in a peat and loam soil, and require an abundant and constant supply of water. Propagated by cuttings of half-ripened shoots, placed in sand, under a bell glass, in gentle bottom heat.

L. ciliosa (ciliated). *fl.* yellow; corymbs many-flowered. Summer. *l.* crowded, on long petioles, oblong-lanceolate, glandularly setose, setosely mucronate. *h.* 8ft. to 12ft. Brazil, 1848. (B. M. 4048; P. M. B. xi. 3.)

L. corymbosa (corymbose). *fl.* yellow, large, few, disposed in corymbs. Summer. *l.* on short petioles, narrow-oblong, acutish, cuneated at base. Brazil, 1840. Tree.

LUZURIAGA (named in honour of Ignatio M. R. de Luzuriaga, a Spanish botanist). SYNS. *Callixene* and *Enargea.* ORD. *Liliaceæ.* A small genus (three species) of half-hardy shrubby-branched under-shrubs, two of which inhabit Chili, and the third is a native of the region of the Magellan Straits and New Zealand. Flowers white, solitary or few, in the axils of the leaves; pedicels slender; perianth deciduous; segments distinct, sub-equal, spreading. Berry sub-globose, indehiscent. Leaves often sessile, alternate, rather small, oblong-elliptic, prominently three to many-nerved. Stems shrubby, glabrous. The species thrive on turfs of fibry peat, or attached to stems of Tree Ferns. They like shade and moisture. Propagated by cuttings.

L. erecta (erect).* *fl.* solitary, in the axils of the leaves; perianth frequently dotted with reddish-brown. Berry ¼in. thick. *l.* alternate, oblong, ½in. to 1in. long. *h.* 1½ft. Chili. A copiously-branched, sub-scandent sub-shrub. SYN. *Callixene polyphylla* (under which name it is figured in B. M. 5192).

L. marginata (margined). *fl.* solitary, in the axils of the leaves of the upper branches, scented like Heliotrope; pedicels very short, erect. *l.* alternate, sessile, ascendent, oblong, thick, rigid, pale green, mucronate, ¼in. to ⅜in. long; margin revolute. Tierra del Fuego. SYN. *Callixene marginata.*

L. radicans (rooting). *fl.* pure white, large, 1½in. in diameter, regular, star-shaped; anthers yellow, connivent into a cone. Summer. *l.* sessile, glabrous, ovate-lanceolate. Stems slender, wiry. Chili and Peru.

LYCASTE (called after Lycaste, the beautiful daughter of Priam). Including *Colax* and *Paphinia*. ORD. *Orchideæ*. A genus comprising about twenty-five species of very ornamental stove or greenhouse epiphytal or terrestrial Orchids, natives of tropical America, extending from Peru to Mexico and the West Indies. They are nearly allied to *Anguloa*. The genus is remarkable in having the middle of the lip furnished with a transverse, fleshy, entire or notched appendage. The species are of easy culture, and especially valuable to the amateur grower, as they require very little artificial heat. They should be potted in rough fibrous peat and sphagnum, and drained well; for, although these plants produce stout pseudo-bulbs, which would enable them to sustain life for a long time, they nevertheless increase faster, and flower more profusely, when kept moderately moist during the resting season. Whilst growing, Lycastes can scarcely have too much water, always providing it is allowed to pass away quickly, and that plenty of air be admitted. Propagated by division, after flowering. Stove species, except where otherwise stated.

L. aromatica (aromatic).* *fl.* yellow, disposed in spikes; lip very hairy. Winter and spring. Mexico, 1828. A common and very free-flowering, warm-house species, remaining in beauty for four or five weeks. (B. R. 1871, under name of *Maxillaria aromatica*.)

L. Barringtoniæ (Mrs. Barrington's). *fl.* greenish, nodding; perigonal divisions ovate-oblong, pointed; lateral cohering, and forming a bluntly conical spur-like auricle; lip smaller; middle lobe ovate-oblong, blunt, ciliate; scape as long as the petioles. April. *l.* oblong, pointed, tapering to the slender petiole. Jamaica, 1790. (B. R. 1206, under name of *Maxillaria ciliata*.)

L. B. grandiflora (large-flowered). This differs from the type chiefly in the very large size of the flowers, which are as much as 5in. in diameter. West Indies, 1868. (B. M. 5706.)

L. cristata (crested).* *fl.* white outside, interruptedly banded with purple inside; petals purple, whitish at base; scape pendulous, few-flowered. June to August. *l.* oblong-lanceolate, shortly stalked, plicate. Trinidad, 1834. Intermediate. (B. M. 4836, under name of *Paphinia cristata;* B. R. 1811, under name of *Maxillaria cristata*.)

L. cruenta (bloody).* *fl.*, sepals greenish-yellow; petals deep orange; lip deep orange, blotched with crimson. March and April. Guatemala, 1841. This very free-flowering species thrives in a vinery, or even a greenhouse. It remains in beauty a month. (B. R. 1842, 13, under name of *Maxillaria cruenta*.)

L. Deppei (Deppe's)* *fl.* pale greenish-yellow, blotched with brown; lip white, spotted with crimson, having a golden-yellow crest. Winter and spring. South Mexico, 1838. A distinct, though not very handsome, warm-house species, flowering freely, and remaining in beauty for a considerable time. SYN. *Maxillaria Deppei* (B. M. 3395).

L. fulvescens (tawny). *fl.* tawny, orange; sepals lanceolate, lateral ones falcate; lip oblong; lateral segments small, acute; middle one ovate, obtuse, fringed, with a fleshy emarginate appendage. *h.* 2ft. Columbia. (B. M. 4193.)

L. gigantea (gigantic). *fl.*, sepals and petals green, shaded with brown, from 3in. to 4in. long; lip of a deep purple colour, margined with rich orange, serrated; column white. June and July. Central America, 1848. (B. M. 5616; B. R. xxxi. 34.)

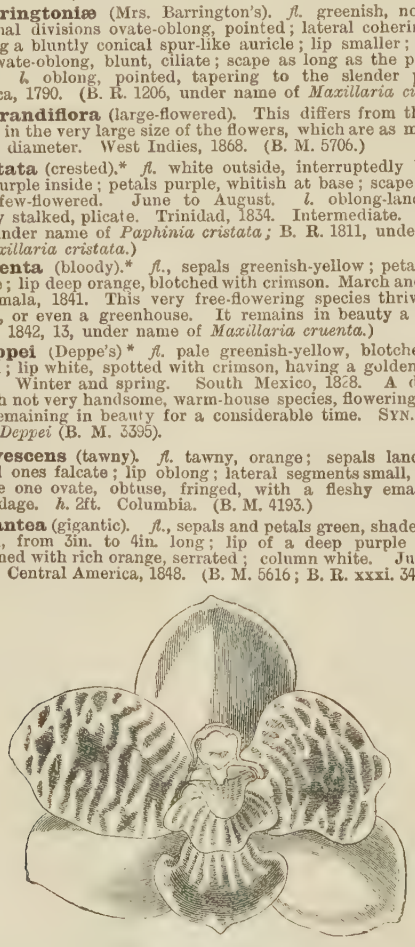


FIG. 482. FLOWER OF LYCASTE JUGOSA.

L. jugosa (ridged).* *fl.* about 2in. in diameter; sepals cream-colour; petals white, with numerous stripes of rich dark purple; lip white, irregularly striped and veined with deep velvety-purple; scape erect, two or three-flowered. April and May. *l.* in twos, dark green, 2in. broad. Pseudo-bulbs smooth and somewhat

Lycaste—*continued.*

ovate. Brazil, 1867. The compost best suited for this warm-house species is one formed of chopped sphagnum and good peat, to which some medium-sized lumps of charcoal may be added, with considerable advantage. SYN. *Colax jugosus*. See Fig. 482. (B. M. 5661.)

L. lanipes (woolly-stalked). *fl.* solitary; sepals and petals creamy-white; lip white, beautifully ciliated or fringed along its margin. October. *l.* lanceolate, 12in. to 18in. long. Pseudo-bulbs large. South America, 1848. Often met with in collections under the name of *L. Barringtoniæ*.

L. lasioglossa (hairy-lipped).* *fl.* 5in. long, inclined; sepals dull cinnamon-brown, spreading, narrow-oblong; petals golden-yellow, one-third the length of sepals, arched, with rounded tips; lip golden-yellow, with purple spots on the midlobe, narrow, about equalling the sepals; midlobe clothed with interlaced hairs; scape stout, with a sheath above the middle. *l.* 8in. to 12in. long, elliptic-lanceolate, acuminate, plaited, bright green. Pseudo-bulbs 3in. long, ovoid, compressed, grooved. Guatemala, 1872. Intermediate. (B. M. 6251.)

L. linguella (small-tongued). *fl.* whitish; lateral sepals deflexed. January. Peru (?), 1871. This plant is closely related to *L. ciliata* and *L. lanipes*. (B. M. 6303.)

L. Puydtii (Puydt's). *fl.* green, with a few dark purple-brown spots on the central part of the sepals, and numerous confluent ones on the petals; lip livid violet. Brazil, 1880. Probably only a variety of *L. jugosa*. SYN. *Colax Puydtii*. (I. H. n. s. 369).

L. Skinneri (Skinner's).* *fl.* from 4in. to 6in. across, solitary; sepals and petals white, more or less suffused with rose; lip rosy-lilac, frequently very heavily blotched with the deepest rosy-crimson; scapes from 6in. to 12in. high. November to March. *l.* solitary, long, broad, dark green, plaited. Pseudo-bulbs large, dark green. Guatemala, 1842. A splendid species, and one of the most profuse-flowering orchids in cultivation. (B. M. 4445.) It has numerous very beautiful varieties, of which the following is a good selection:

L. S. delicatissima (very delicate). *fl.* large, about 6in. across; sepals and petals pinkish-white; lip white, intermixed with rose. February. (W. S. O. 10.)

L. S. gloriosa (glorious). *fl.*, sepals very large and broad, pale pink; petals rich rosy-pink, somewhat lighter inside; lip white towards the front. Guatemala.

L. S. picturata (spotted). *fl.* large, 7in. across; sepals and petals strongly tinged with rose; lip white, spotted, and heavily stained at the base with crimson. (W. S. O. 10.)

L. S. purpurata (purple). *fl.* large, 6in. across; sepals and petals blush-white; lip rich crimson-purple. (W. S. O. 10.)

L. S. rosea (rosy). *fl.* large, quite 7in. in diameter; sepals and petals rich dark rose; lip white, spotted with crimson. Guatemala. A very fine variety.

L. S. superba (superb). *fl.*, sepals and petals blush-white; lip very rich crimson. Guatemala. Another splendid variety.

L. S. virginalis (virginal). *fl.*, sepals and petals snow-white; lip white, with a faint tinge of lemon towards the base. Guatemala. A very handsome but rare variety.

L. Smeeana (Smee's). *fl.* white, except the lip, which has a light purple border of the triangular acute undulate anterior lacinia, rows of small purple stripes, and spots over the whole surface; petals purple-spotted on the inside. Probably a hybrid between *L. Deppei* (having similar flowers) and *L. Skinneri*.

L. tetragona (tetragonal). *fl.* green, yellow, and purple, solitary; sepals oblong, obtuse, spreading; petals similar, but smaller; lip fleshy, ventricose, three-lobed, erect; lateral lobes small, acute; middle one convex outside. June. *l.* oblong-lanceolate, plicate. Pseudo bulbs tetragonal. *h.* 6in. Brazil, 1830. (B. M. 3146, under name of *Maxillaria tetragona*; B. R. 1428.)

LYCHNIS (the old Greek name given by Theophrastus to this or a similar plant, from *lychnos*, a lamp, perhaps referring to the brilliancy of the flowers). Rose

FIG. 483. SEED VESSEL OF LYCHNIS.

Campion. Including *Agrostemma*, *Githago*, *Melandrium*, *Petrocoptis*, and *Viscaria*. ORD. *Caryophylleæ*. A genus comprising about thirty species of ornamental hardy annual or perennial plants, widely spread over the

Lychnis—*continued.*

Northern hemisphere without the tropics. The general characters of this genus are those of *Silene*, from which it differs in having five styles; calyx inflated, five-toothed, ten-nerved; capsule (see Fig. 483) septicidal, opening by as many teeth as there are styles; seeds with small tubercles; the petals also usually have an appendage at

FIG. 484. LYCHNIS ALPINA, showing Habit and detached Portion of Inflorescence.

the base of the blade. All the species are of very easy culture, thriving in almost any ordinary garden soil, but succeeding best in a light, rich loam. Propagation is readily effected in spring, by divisions, or by seeds. All the species described below are perennials.

FIG. 485. FLOWERING BRANCH OF LYCHNIS CHALCEDONICA.

L. alpina (Alpine).* *fl.* pink, disposed in close, compact heads, ½in. in diameter; petals narrow, deeply two-cleft; calyx short. Spring and summer. *l.* crowded, linear-lanceolate, slightly

Lychnis—*continued.*

fringed; lower ones tufted. *h.* 6in. Alps of Europe (Britain). See Fig. 484. (B. M. 394.)

L. chalcedonica (Chalcedonican).* *fl.* scarlet, in dense corymbose clusters; calyx round, clubbed, ribbed. Summer. *l.* lanceolate, slightly cordate at base, pilose, stem-clasping. *h.* 1½ft. to 3½ft. Russia, &c., 1593. A well-known and deservedly favourite plant, of which there are several varieties, including double white and double red. It thrives best in a sandy loam, enriched with well-rotted manure. The single forms, white and red, may be propagated by seed, which ripens very freely, and is practically self-sowing. The double kinds should be divided early in spring. See Fig. 485. (B. M. 257.)

FIG. 486. FLOWERING BRANCH OF LYCHNIS CORONARIA.

L. coronaria (crowned).* *fl.* red; petals emarginate; calyx subcampanulate, costate; peduncles elongated, one-flowered. July. *l.* broadly lanceolate, coriaceous. *h.* 3ft. South Europe, 1596. See Fig. 486. (B. M. 24.)

FIG. 487. COROLLA OF LYCHNIS FULGENS.

L. diurna (day-flowering).* Bachelors' Buttons; Common Red Lychnis; Red Campion. *fl.* purplish-rose; panicle terminal, many-flowered; calyx very hairy. Spring to autumn. *l.* opposite, lower ones obovate-spathulate, upper ones oval-elliptical *h.* 1ft. to 3ft. Northern hemisphere (Britain). (Sy. En. B. 211, under name of *Silene diurna.*) A showy and pretty plant under

Lychnis—*continued.*

cultivation; the double form, however, is the more attractive one, and is one of the best plants of this genus for borders. It is increased only by divisions.

L. Flos-cuculi. Cuckoo Flower; Ragged Robin. *fl.* red; panicle loose, terminal, forked, clammy; calyx purplish-red, the ten ribs darker; petals divided into four linear segments, the middle one the longest. Summer. *l.* few, linear-lanceolate. *h.* 1ft. to 2ft. Europe (Britain), Siberia. A well-known and common plant, occurring in nearly all marshy places. (Sy. En. B. 212.) The double-flowered form is a most desirable plant for borders.

L. flos-Jovis (Flower of Jove). A synonym of *Agrostemma flos-Jovis.*

L. fulgens (brilliant).* *fl.* brilliant vermilion, large, handsome, disposed in fastigiate corymbs; petals four-cleft, outer segments awl-shaped; calyx terete, woolly. Spring and summer. *l.* ovate-lanceolate, hairy. *h.* 6in. to 12in. Siberia, 1822. See Fig. 487. (B. M. 2104.)

FIG. 488. COROLLA OF LYCHNIS FULGENS GRANDIFLORA.

L. f. grandiflora (large-flowered). *fl.* scarlet, about 2in. across, solitary, or in threes, terminal and axillary; petals prettily lacerated. Summer and autumn. *l.* ovate, almost sessile, smooth. *h.* 8in. to 12in. China, 1774. This variety requires a warm border. See Fig. 488.

FIG. 489. COROLLA OF LYCHNIS FULGENS HAAGEANA.

L. f. Haageana (Haage's).* *fl.* brilliant scarlet, about 2in. across, in twos or threes; petals broadly obovate, indented on the top, and furnished with two long teeth at the side; calyx shaggy, inflated, angular. Summer. *l.* large, lanceolate, acuminate, hairy, purplish underneath. Stems very shaggy. A garden hybrid, probably from *L. fulgens.* It is a showy and exceedingly handsome border plant. See Fig. 489. (R. G. 391.) There are numerous varieties of it, affording nearly every shade of colour, from scarlet to pure white.

L. f. Sieboldi (Siebold's). *fl.* pure white, very large; cyme contracted, terminal, few-flowered; petals wedge-shaped, irregular, margins jagged, slightly two-lobed. Summer. *l.* sessile, lower ones oblong, middle and upper ones ovate-oblong, acute, entire, soft and downy. *h.* 1ft. Japan. See Fig. 490.

L. Lagascæ (Lagasca's).* *fl.* bright rose, with white centres, less than 1in. in diameter. Spring and summer. *l.* obovate or oblong, somewhat coriaceous, slightly glaucous. *h.* 3in. Pyrenees, 1867.

Lychnis—*continued.*

An elegant little compact-growing and tufted plant for rockwork; it thrives best on sunny slopes. SYN. *Petrocoptis pyrenaica.* (B. M. 5746.)

FIG. 490. COROLLA OF LYCHNIS FULGENS SIEBOLDI.

L. oculata (eyed). *fl.* pinkish-purple, the emarginate petals having an intense purple spot at the base; appendage shortly ovate; calyx suddenly contracted below the middle, the angles clavate, rugoso-crispate. July. Algiers, 1843. SYN. *Viscaria oculata* (under which name it is figured in B. M. 4075 and B. R. 1843, 53).

L. Preslii (Presl's). *fl.* purplish, nearly 1in. in diameter, numerously produced in forked, panicled clusters, and having reddish bracts; corona fringed, satiny-rose; calyx reddish, much inflated. Summer. *l.*, root ones numerous, oval-lanceolate or obovate acuminated, decurrent, in rosettes; those of the stem oval obtuse, entire, much-veined, dark green. *h.* 1ft. to 1½ft. Bolivia.

L. pyrenaica (Pyrenean).* *fl.* pale flesh-colour, about ½in. across, disposed in forked clusters; pedicels long, one-flowered; petals slightly notched; calyx bell-shaped. Summer. *l.* opposite, glaucous, root ones spathulate, those of the stem cordate, sessile. *h.* 3in. to 4in. Pyrenees, 1819. (B. M. 3269.)

L. vespertina (evening-flowering).* *fl.* white, emitting a pleasant odour in the evening, and disposed in loose terminal panicles; calyx over ½in. long, hairy, ribbed; petals cleft. Summer. *l.* opposite, connate, oval-oblong, acuminated, tapering at the base, hairy. Stems purplish, swelling at the joints. *h.* 1ft. to 3ft. Europe (Britain), Asia, &c. The double-flowered form is that most usually cultivated.

L. Viscaria (clammy).* German Catch-fly. *fl.* rosy, in close heads; petals bifid; calyx tubular, narrow, about ½in. long. Summer. *l.* opposite, narrow-lanceolate, with a slightly woolly fringe at the base. Stems smooth, clammy in the upper part. *h.* 1ft. Europe (Britain), Siberia. There are several very desirable varieties of this pretty plant; the double-flowered form, and the one with deep red flowers, known as *splendens*, are especially so.

LYCIOPLESIUM. A synonym of **Latua** (which *see*).

LYCIUM (from *Lukion*, a name given to the Rhamnus by Dioscorides, as coming from Lycia, in Asia Minor). Box Thorn. ORD. *Solanaceæ.* An extensive genus (about seventy species have been described) of hardy or nearly hardy, deciduous, climbing or trailing, often spiny, shrubs or small trees. Flowers whitish, pale violet, pink, scarlet, or yellowish, small, variously disposed; corolla funnel-shaped. Leaves simple, entire or nearly so. The species are very free-flowering, and are admirably adapted for training against trellis-work or walls. They thrive in almost any well-drained and porous soil. Propagation is easily effected, in autumn or spring, by cuttings, by layers, or by suckers. In all probability, the only species introduced are those described below, which are all hardy.

L. afrum (African).* *fl.* violet, almost axillary, solitary, drooping. June and July. *l.* fascicled, linear, canescent, attenuated at the base, obtuse, fleshy. *h.* 6ft. to 10ft. North Africa, 1712. An ornamental, erect, spiny shrub. (B. R. 354; S. B. F. G. 324.)

L. barbarum (Barbary).* *fl.*, twin, extra-axillary, pedicellate; corolla with a purple limb and a yellowish base. May to August. *l.* lanceolate, flat, glabrous, acute. Branches angular, dependent. North Asia, 1696. An ornamental climbing shrub.

L. chinense (Chinese). *fl.* purple; peduncles much longer than the entire calyx. May. *l.* in threes, ovate, acute, attenuated at the base. Branches pendulous, prostrate, striated. China. A climbing shrub, very closely allied to *L. europæum*, but the tube of the corolla is shorter, and constricted in the middle.

Lycium—*continued.*

L. europæum (European). *fl.* pale violet, reticulated with red veins, twin or solitary. May to August. *l.* fascicled, obovate-lanceolate, obtuse or spathulate, bent obliquely. Branches erect, loose. *h.* 10ft. to 12ft. South Europe, 1730. An erect, spiny shrub.

L. fuchsioides (Fuchsia-like). A synonym of *Iochroma fuchsioides.*

LYCOPERDON (from *lykos*, a wolf, and *perdein*, to break wind; some of the older writers believed that this fungus developed from the dung of the wolf). A genus of fungi, known also as "Puff-balls." This latter name is given to them because of the abundant brown dusty spores, like snuff, that are emitted when the plant is mature and bursts, either naturally or by pressure from without. *Lycoperdon* belongs to the group of *Trichogastres*, together with the "Starry Puff-balls" (*see* **Geaster**), which have the outer rinds splitting like a star, and recurved. There are several kinds common in Britain on meadows and lawns, in woods, &c. Among the most widely known is

FIG. 491. LYCOPERDON GEMMATUM.

L. gemmatum (see Fig. 491), which, in size and general appearance, may be regarded as a fair type of the genus. On their first appearance they are like white balls, and of a fleshy texture; some kinds form an indistinct stalk, while others have no stalk. When cut across in this state, they are found to have a compact rind, filled with loose tissue of indistinct threads, which leave between them small spaces; on the sides of these spaces are situated larger cells, each bearing at their free end four spores, supported on short slender stalks. The fungus changes from yellowish-brown to dark brown as the spores ripen. At last, the rind tears open at the apex, and the spores are ejected, leaving a fibrous mass of filaments behind them. The Puff-balls, while white and fleshy, are edible; and *L. giganteum*, a species that grows so large as to suffice for a meal for ten or twelve persons, is esteemed as an article of food by many people. The balls cease to be good for food when they begin to turn brown. The fibrous mass that remains after the spores have escaped is sometimes used as a styptic for wounds, or in making tinder.

LYCOPERSICUM (from *lykos*, a wolf, and *persicon*, a peach; in allusion to the fleshy fruit, and its inferiority compared with the peach). Love Apple; Tomato. ORD. *Solanaceæ*. A genus of three or four species of herbaceous, unarmed, procumbent plants, inhabiting South America, distinguished chiefly from the allied genus *Solanum* by the stamens having their anthers connected together by a thin membrane, which is prolonged upwards. Peduncles solitary, extra-axillary, many-flowered; corollas rotate, with a very short tube. Fruit fleshy, usually red or yellow, divided into two, three, or many cells, containing numerous seeds imbedded in the pulp. Leaves imparipinnate. For culture, varieties, &c., of *L. esculentum*, *see* **Tomato.**

L. esculentum (edible). *fl.* green, numerous, several joined in one. Summer. *l.* unequally pinnate; leaflets cut, attenuated at the apex, glaucescent beneath. *h.* 2ft. to 3ft. South America, 1596. Plant pilose.

LYCOPODIACEÆ. A natural order of cryptogams, comprising four genera and about 150 species. They are found in all climates, and are either terrestrial or epiphytal perennials. Generally speaking, the rootstock is running or creeping, but sometimes there is a corm. The stems are dichotomously branched, are leafy throughout, and usually rigid. The leaves are imbricate all round the stems, and are arranged in from two to six ranks; they are simple, nerveless, or one-nerved. The capsules or sporangia are sessile in the axils of the leaves or of the scales of a terminal, axillary, sessile or stalked cone, are one to three-celled, compressed, often kidney-shaped, and two-valved. The general affinities of the order are with *Filices*.

LYCOPODIUM (from *lykos*, a wolf, and *pous*, a foot; the roots have a resemblance to a wolf's paw). Club Moss. ORD. *Lycopodiaceæ*. A genus of about 100 species of stove, greenhouse, or hardy perennial plants, allied to *Selaginella*, but distinguished from that genus by the coniferous habit, and the single form of capsules. The leaves vary from mere threads to imbricated scales. Lycopodiums may be distinguished by the following characters: Capsules axillary, solitary, sessile, roundish, one-celled, some two-valved, including a powdery substance; others three-valved, containing a few large grains or spores. This genus contains numerous very handsome plants for Wardian or other fern cases. As a rule, they thrive in a rough, spongy peat. The native species are also very pretty plants for conservatory or Wardian case culture; they should be shaded from the sun. *See also* **Selaginella.**

L. alpinum (alpine). Stems prostrate. Branches in tufts, erect, forked, level-topped. *l.* acute, keeled, imbricated in four rows; spikes terminal, solitary, sessile, cylindrical, their leaves broadly-lanceolate, flat. Europe, &c. (Britain). A very pretty evergreen species, about 4in. high, and of a bright green colour.

L. annotinum (year-old). Stems decumbent at the base. Branches ascending, forked. *l.* in five rows, narrow-lanceolate, acute, minutely serrate; spikes cylindrical, solitary, sessile. Northern hemisphere (Britain). A distinct and pretty species, 6in. to 8in. high, easily distinguished by its branches being constricted here and there.

L. cernuum (drooping). Stems from 8in. to 2½ft. high. Branches much-forked. *l.* distant, somewhat acicular, bright light green. Tropics. A very handsome stove species, somewhat difficult to cultivate successfully; it varies considerably under different conditions, but usually only in the height and in the density of its branches. This species should have a compost of loam, peat, and limestone—fully two parts of the latter—and be well drained.

L. clavatum (club-shaped). Common Club Moss. Stems creeping, branched, 1ft. to 3ft. long. Branches ascending. *l.* crowded, narrow-lanceolate, incurved, hair-pointed; spikes in pairs, cylindrical, stalked, with ovate, membranous leaves. Arctic and North and South temperate and cold regions (British Isles), &c. A handsome plant.

L. dendroideum (tree-like).* Stems erect, much-branched, growing to a height of from 6in. to 9in. *l.* small, bright shining green; spikes yellow, long, cylindrical, erect. North America (in moist woods). A very pretty hardy plant, resembling, when growing vigorously, a miniature Spruce Fir. It makes an excellent plant for rockwork, if grown in a deep bed of moist sandy peat, with full exposure to the sun. It may be propagated by sowing the spores in a rather shady spot and on a perfectly level surface.

L. densum (dense). Stems erect, slender, much-branched. *l.* numerous, dense, short, sharp-pointed, bright green. Australia. A very handsome greenhouse plant.

L. Hookerii (Hooker's). Stem erect, several times divided towards the base; on each division hangs a bunch of slender catkins, from three to five in number, also branched, and some 4in. long, bearing the sporangia, giving the plant a very pleasing and novel appearance. *l.* bright shining green, nearly 1in. long. *h.* 2ft. or more. East Indies. A very handsome stove, evergreen, epiphytal species, requiring to be grown in peat, and suspended so that the plant hangs downwards.

L. Phlegmaria (Phlegmaria).* This species is closely allied to *L. Hookerii*, but not nearly so robust; the contracted fertile catkins, being more elegant and more slender than those of *L. Hookerii*, give the plant a beautiful tasselled appearance. Tropics. A stove evergreen epiphyte.

L. scariosum (scarious). Stems from 9in. to 2ft. high, rigid, branched, erect; branches flattened, the leaves situated on each side and decurrent with it, light green; spikes or fertile catkins 2in. to 3in. long, light brown, imbricated, numerously disposed on

Lycopodium—*continued.*

slender, upright stems, 3in. to 4in. high. New Zealand. A rare and handsome, terrestrial, greenhouse species.

L. Selago (Selago). Fir Club Moss. Stems erect, 3in. to 4in. high, forked. Branches level at the top. *l.* in eight rows, uniform, narrow-lanceolate, acute, entire. Temperate and cold regions of both hemispheres (British Isles).

L. taxifolium (Yew-leaved).* Stems thickly clothed with bright green, acuminate leaves, about ¼in. long. *h.* 9in. to 12in. Jamaica. A very handsome stove species; the ends of its branches are swollen, and the sporangia situated at the base of the leaves. It must be suspended head downwards. (B. H. 1871.)

L. uliginosum (swamp-loving). Stems slender, much-branched. *l.* small, very closely set, bright dark green. *h.* 6in. Australia. A pretty greenhouse species, thriving well in peat and sand, and with plenty of drainage.

L. verticillatum (whorled). Stems several times forked. *l.* in whorls round the stem, ¼in. long, acuminate, dark green. Mauritius. A very handsome, procumbent, stove species, growing from 10in. to 20in. long.

LYCORIS (named after a beautiful Roman actress, mistress of Marc Antony). ORD. *Amaryllideæ*. A genus comprising three species of greenhouse bulbous plants, natives of China, Japan, and Central Asia, allied to *Amaryllis*, from which they may be distinguished by the undulated divisions of the spreading perianth being curved upwards, and bearing a simple fringed stigma. For culture, &c., *see* **Amaryllis.**

L. aurea (golden).* *fl.* golden-yellow, stalked, erect, funnel-shaped, clavate; segments linear-lanceolate. August and September. *l.* greenish, strap-shaped. *h.* 1ft. China, 1777. A very pretty species, the flowers appearing before the leaves. SYN. *Amaryllis aurea* (under which name it is figured in B. M. 409).

L. radiata (rayed). *fl.* deep pink, approaching to scarlet. June. *l.* linear-ligulate, obtuse, glaucous-green, about ½in. wide. *h.* 1½ft. China, 1758. SYN. *Nerine japonica*. (B. R. 596; A. B. R. 95, under name of *Amaryllis radiata*.)

FIG. 492. LYCORIS SEWERZOWI, showing Habit, and detached Flower (natural size).

L. Sewerzowi (Sewerzow's).* *fl.* brownish-red, fragrant. Summer. *l.* strap-shaped, bluntish. *h.* 1ft. Turkestan, 1877. See Fig. 492. (R. G. 914.)

LYDA. A genus of Sawflies, the larvæ of which do considerable damage to trees. The larvæ have no prolegs, but at the end of the body are two organs somewhat like true legs, and with the help of these organs they move along slowly. They are usually semi-social, spinning a web in common over twigs and leaves, but also each spinning a separate tube for itself within the web, in which it lives. They become pupæ in the soil. *L. nemoralis* and *L. Pyri* injure Plums and other stone-fruit trees, Apple and Pear-trees, &c., and they also eat Hawthorn; other species feed on Willows, Birches, and Alder, and several (*L. campestris, L. erythrocephala*, &c.) do very considerable injury to conifers. The habits of the larvæ facilitate their destruction in the webs, the appearance of which is shown at Fig. 493.

Lyda—*continued.*

FIG. 493. LARVÆ AND WEB OF LYDA PYRI.

LYGEUM (from *lygeo*, to bend; alluding to the flexibility of the plant). ORD. *Gramineæ*. The only species of this genus is a hardy perennial grass. It thrives in any light loamy soil, and may be increased by dividing at the roots.

L. Spartum (Spartum). *fl.* hermaphrodite; peduncle terminal; spikelet usually large, erect or nodding, two, rarely three-flowered. May. *l.* rush-like, erect, long, convolute-terete, subulate, acuminate. *h.* 1½ft. Mediterranean region (rocky places on the seashore), 1776. This species furnishes Albardine, a valuable material for paper-making. The plant which yields the Esparto of the paper-makers is *Macrochloa tenacissima*.

LYGODICTYON FORSTERI. A synonym of **Lygodium reticulatum** (which *see*).

LYGODICTYON HETERODOXUM. A synonym of **Lygodium heterodoxum** (which *see*).

LYGODICTYON LINDENI. A synonym of **Lygodium heterodoxum** (which *see*).

LYGODIUM (from *lygodes*, flexible; referring to the flexible habit). ORD. *Filices*. A genus comprising about eighteen species of handsome, wide-scandent, twining, mostly stove ferns, widely diffused. Capsules solitary (or casually in pairs), in the axils of large, imbricated, clasping involucres, which form spikes either in separate pinnæ or in lax rows along the edge of the leafy ones. The species are readily distinguishable from all others by their wide-scandent climbing stems; the fronds are permanent, and become interlaced with each other, sometimes forming, together with other plants, impervious thickets. As a rule, the species thrive in a compost of peat, loam, and sand, in equal parts. For general culture, *see* **Ferns.**

L. articulatum (jointed). *primary petiole* ¼in. to ½in. long; *secondary* 1in. or more long; barren pinnules twice forked, each bearing four ligulate-oblong segments, which are 2in. to 3in. long, about ¼in. broad, blunt at the point, very distinctly articulated at the base on a short petiole; fertile pinnules many times dichotomous, the short spike in dense clusters, which are often almost destitute of lamina. New Zealand, 1844.

L. circinatum (circinate). A synonym of *L. dichotomum*.

L. dichotomum (dichotomous).* *primary petiole* so much reduced that the fork seems almost to spring from the main rachis; *secondary* 1in. to 2in. long, firm, naked; pinnules digitate, with five or six lobes reaching nearly down to the base, or once or even twice forked; ultimate barren divisions 4in. to 8in., or even 12in. long, ¼in. to ⅜in. broad, the fertile ones contracted. *spikes* one to two lines long, in close marginal rows. Chusan, Hong Kong, &c. SYNS. *L. circinatum* and *L. pedatum*.

L. Forsteri (Forster's). A synonym of *L. reticulatum*.

L. hastatum (halbert-shaped). A synonym of *L. volubile*.

Lygodium—*continued.*

L. heterodoxum (heterodox). *primary petiole* obsolete or very short; *secondary* 1½in. long; pinnules with two or three bipartite segments, the ultimate divisions 4in. to 6in. long, ⅜in. broad, the petioles not articulated, the lowest often ½in. long. *spikes* one line long, in close rows along the edge of the leafy divisions. Mexico. SYNS. *L. Lindeni* (of gardens), *Hydroglossum heterodoxum*, *Lygodictyon heterodoxum*, and *Lygodictyon Lindeni*.

FIG. 494. LYGODIUM JAPONICUM, showing Habit and detached Portion of Frond.

L. japonicum (Japanese).* *primary petiole* very short; *secondary* ½in. to 1in. long; pinnules 4in. to 8in. long, nearly as broad, deltoid; the terminal segments pinnatifid or hastate; the lateral ones long-stalked, and pinnate in the lower part; the divisions entire or crenulate. *spikes* one to two lines long, the lamina of the fertile divisions often much reduced. Japan to Australia. Greenhouse. SYN. *Ophioglossum japonicum*. See Fig. 494.

L. Lindeni (Linden's). A garden synonym of *L. heterodoxum*.

L. microphyllum (small-fronded). A form of *L. scandens*.

L. palmatum (palmate).* *primary petiole* slender, ⅛in. to ¼in. long, each fork in the lower part of the stem bearing a single cordate, palmate pinnule 1½in. to 2in. broad, not so deep, bluntly four to six-lobed more than half-way down, the slender petiole ½in. to ⅝in. long; fertile pinnules sub-deltoid, three or four-pinnatifid, formed only of winged rachises and short spike-like fertile ultimate divisions, the latter linear, 1in. to 1½in. long. Massachusetts to Florida. See Fig. 495.

L. pedatum (pedate). A synonym of *L. dichotomum*.

L. polymorphum (many-formed). A synonym of *L. venustum*.

L. polystachyum (many-spiked). *primary petiole* short or obsolete; *secondary* ¼in. to 1½in. long; pinnules 8in. to 12in. long, 4in. to 6in. broad; segments uniform, nine to twelve on each side, 2in. to 3in. long, ⅜in. broad, articulated at base, pinnatifid more than half-way down to the rachis into close, entire, blunt lobes, ⅛in. broad; upper segments sessile, lower ones short-stalked. Malay Peninsula.

L. reticulatum (reticulated).* *primary petiole* ⅛in. to ¼in. long; *secondary* ¼in. to ½in. long; pinnules 6in. to 9in. long, 4in. to 6in. broad, with a terminal segment, and four to six nearly uniform ones on each side, which are cordate-hastate or ligulate-oblong, rounded or cordate at the base, 2in. to 3in. long, ⅛in. to ⅜in. broad, all articulated at the base, the lowest short-stalked. *spikes* one to three lines long, in close rows along the edge of the segments. Polynesian Isles, &c. SYNS. *L. Forsteri*, *L. Schkuhri*, *Hydroglossum reticulatum*, and *Lygodictyon Forsteri*.

L. scandens (climbing).* *primary petiole* very short; *secondary* ¼in. to ½in. long; pinnules 4in. to 8in. long, 2in. to 4in. broad, with a terminal segment and four or five on each side, which are very variable in shape, usually simple, ovate or ligulate-oblong, with a rounded or cordate base, sometimes hastate or even slightly pinnate below, always articulated on a short petiole, spreading from the rachis at right angles. *spikes* one to three lines long, in close rows along the edge of the segments. South China to Ceylon, &c. SYN. *Ophioglossum scandens*. *L. microphyllum* is a common form, with short broad segments.

L. scandens (climbing), of Schkuhr. A synonym of *L. volubile*.

L. Schkuhri (Schkuhr's). A synonym of *L. reticulatum*.

L. venustum (pleasing).* *primary petiole* very short; *secondary* ¼in. to ½in. long; pinnules 6in. to 12in. long, 4in. to 6in. broad, with a terminal segment, and four to twelve on each side, which are simple, ligulate-oblong, the lower ones usually hastate or pinnate below, all articulated at the base, bluntly lobed at the edge when barren, the upper ones sessile, the lower ones on a spreading petiole, ⅛in. to ½in. long. *spikes* one to four lines long, in close rows. West Indies to Peru, 1845. SYN. *L. polymorphum*.

Lygodium—*continued.*

L. volubile (twining).* *primary petiole* nearly or quite obsolete; *secondary* about 1in. long; pinnules 8in. to 12in. long, 6in. to 10in. broad, with a simple broad, ligulate-oblong, terminal segment, 3in. to 6in. long, 1in. to 1½in. long, and three to five like it on each side, truncate or sub-cuneate, articulated at the base, and all distinctly stalked. *spikes* one to three lines long, in close rows along the edge of the leafy segments. West Indies and Mexico to Brazil and Peru, 1810. SYNS. *L. hastatum*, *L. scandens*.

FIG. 495. LYGODIUM PALMATUM.

LYONIA (named in honour of John Lyon, a collector of North American plants). ORD. *Ericaceæ*. This genus, formerly included under *Andromeda*, comprises about eight species of hardy or greenhouse trees or shrubs. They are natives of North America, Mexico, Jamaica, and Cuba. Flowers small, in fascicles or racemes, sometimes paniculate, axillary; corolla urceolate or globose, pubescent, four or five-dentate; teeth recurved. Leaves alternate, petiolate, persistent or deciduous, entire or obscurely serrulate. Lyonias succeed best in peat or sandy loam. Propagation is effected by layers; or by seeds, which, being extremely small, require careful sowing in a sandy-peat soil.

L. ferruginea (rusty-coloured). *fl.* white; pedicels aggregate, axillary. April and May. *l.* coriaceous, stiff, crowded, on short petioles, cuneate-lanceolate, acute, quite entire, convex, with revolute edges. *h.* 20ft. Carolina to Florida, 1774. Whole plant clothed with brown, umbilicate, furfuraceous scales. Low greenhouse shrub. SYN. *Andromeda rigida* (under which name it is figured in L. B. C. 430).

L. jamaicensis (Jamaica). *fl.* white; corolla oblong. July. *l.* bluntish, evergreen, glabrous, lanceolate or elliptical-lanceolate, quite entire or repand, reticulated with veins, and at length punctate beneath. Jamaica. Greenhouse shrub. (B. M. 4273.)

Lyonia—*continued.*

L. ligustrina (Privet-like). *fl.* white, small, in pedunculate clusters; corolla nearly globose; floriferous branches terminal, panicled, nearly naked. June. *l.* obovate-lanceolate, sub-acuminated at both ends, almost entire. *h.* 3ft. to 10ft. North America, 1748. Hardy shrub. SYNS. *L. paniculata* (W. D. B. 37) and *Andromeda paniculata.*

L. paniculata (panicled). A synonym of *L. ligustrina.*

LYONSIA (named after Israel Lyons, 1739-1775, Professor of Botany at Oxford, and author of a Flora of Cambridge). ORD. *Apocynaceæ.* A genus comprising about thirteen species of twining shrubs or sub-shrubs, of which one is a native of New Caledonia, one inhabits the Fiji Islands, and the rest are Australian. *L. straminea*, the only species yet introduced, is a greenhouse evergreen twiner, allied to *Parsonsia.* It thrives in a compost of sandy peat, to which may be added a small quantity of fibry loam. Increased, during April, by cuttings of the young shoots, placed in sand, under a hand glass.

L. straminea (straw-coloured). *fl.* striped, small; corolla funnel-shaped, with a five-parted, recurved, bearded limb; cymes terminal, trichotomous. June. *l.* shortly-stalked, ovate-lanceolate or lanceolate, glabrous. New South Wales, &c., 1820.

LYPERIA (from *lyperos*, sad or sorrowful; alluding to the dull, heavy colour of the flowers). ORD. *Scrophularineæ.* A genus comprising about thirty species of greenhouse herbs or sub-shrubs, of little ornamental value. All are natives of South Africa. Flowers axillary, or in terminal spikes or racemes, usually more or less viscous. Lower leaves opposite; upper ones alternate, toothed or much cut, often tufted in the axils, sometimes minute, blackening in drying. This genus is allied to **Zaluzianskia** (which *see* for culture).

L. pedunculata (long-peduncled). *fl.* white; calyx three to four times shorter than the corolla tube; limb of corolla a trifle shorter than the tube; pedicels over 1in. long, axillary, filiform. June to November. *l.* petiolate, sub-fasciculate, obovate-cuneate, deeply toothed. *h.* 1½ft. 1790. Plant suffruticose, divaricately branched, finely pubescent. (A. B. R. 84, under name of *Buchnera pedunculata.*)

LYRATE. Shaped like a lyre. A leaf is Lyrate when its apex is rounded and there are several small lateral lobes towards its base.

LYSANTHE. Included under **Grevillea** (which *see*).

LYSIMACHIA (*Lusimachion*, the old Greek name, from *lysis*, dissolving, concluding, and *mache*, strife; in reference to the supposed soothing qualities of the plant). Loosestrife. Including *Lubinia.* ORD. *Primulaceæ.* A genus comprising about sixty species of greenhouse or hardy, erect or creeping, glabrous or pubescent, slender or robust herbs, often gland-dotted, mostly natives of the temperate and sub-tropical regions of the Northern hemisphere, while a few are found in tropical and Southern Africa, Australia, the Pacific Islands, and South America. Flowers white, yellow, or rosy, rarely purple or blue, very rarely four-parted, axillary or terminal, solitary, racemose, or in simple corymbose umbels or paniculate racemes; corolla hypogynous, funnel-shaped or rotate, five-parted; tube short or very short; lobes five or six, erecto-patent or spreading, entire or toothed; calyx five or six-parted. Leaves opposite, alternate or whorled, sessile or petiolate, entire. The species are all of easy culture, most of them thriving best in a moist situation, such as the margins of streams and ponds. Propagated very freely by divisions, in late autumn or early spring. Except where otherwise stated, the species described below are hardy, and all of them are perennials.

L. angustifolia (narrow-leaved). A form of *L. lanceolata.*

L. atropurpurea (dark purple).* *fl.* very dark purple, disposed in elegantly-drooping racemes. Summer. *l.* fleshy, smooth, obovate. *h.* 2ft. South Europe, 1820. Plant erect. SYN. *Lubinia atropurpurea.*

L. azorica (Azorean). *fl.* yellow; peduncles axillary, solitary, one-flowered; segments of calyx subulate. June. *l.* ovate-lanceolate. *h.* 4in. Azores, 1835. Half-hardy. (B. M. 3273.)

Lysimachia—*continued.*

L. barystachys (strong-spiked).* *fl.* white, small, disposed in dense, erect, terminal, crowded racemes. *l.* lanceolate. China. Plant erect. (R. H., March, 1881.)

L. capitata (headed). A synonym of *L. thyrsiflora.*

L. ciliata (ciliated).* *fl.* light yellow; corolla longer than the calyx. July. *l.* lanceolate-ovate, 3in. to 6in. long, tapering to an acute point, rounded or heart-shaped at base, all on long and fringed petioles. Stem erect, 2ft. to 3ft. high. North America, 1732. (Sy. En. B. 1143.)

L. clethroides (Clethra-like).* *fl.* white, about ½in. across, somewhat star-shaped, disposed in one-sided spikes, nearly 1ft. in length. July to September. *l.*, radical ones spathulate, cauline ones broadly lanceolate, 3in. to 5in. long, entire. *h.* 3ft. Japan, 1869. Plant erect.

L. ephemerum (transient). *fl.* white, with a dark eye, rather small, in terminal, erect racemes. Summer. *l.* linear-lanceolate, glaucous. *h.* 2ft. to 3ft. South-western Europe, 1730. Plant erect. (B. M. 2346.)

L. hybrida (hybrid). A form of *L. lanceolata.*

L. lanceolata (lance-shape-leaved). *fl.* yellow, solitary, axillary, on slender, drooping peduncles; petals slightly notched. Early summer. *l.* glabrous, linear or oblong-lanceolate. *h.* 1ft. to 1½ft. North America. *L. angustifolia*, with a more branching habit and narrow leaves, and *L. hybrida*, with broader foliage, are forms. This species and its varieties are of erect habit.

L. Leschenaultii (Leschenault's). *fl.* brilliant carmine. Autumn. *l.* lanceolate, acute, sometimes opposite or ternate, at others alternate. Stem branching, tufted. *h.* 1ft. India. A half-hardy erect-growing species, but it does well in the rock-garden, in a sandy soil. (F. d. S. 982.)

L. Nummularia (Moneywort).* Creeping Jenny; Moneywort. *fl.* bright yellow, large, about 1in. across, very showy, solitary, axillary, with broad sepals, ciliate petals, and glandular connate filaments. Summer and autumn. *l.* opposite, roundish, obtuse, glabrous. Europe (Britain). A common and handsome creeping plant, excellent for hanging baskets. (Sy. En. B. 1144.)

L. nutans (nodding). *fl.* dark purple, in terminal racemes; lobes of corolla spathulate, erosely denticulated. July and August. *l.* opposite or twin, lanceolate, a little serrated, glæbrous. *h.* 2ft. Cape of Good Hope, 1823. Plant erect, half-hardy. (B. M. 4941.)

L. punctata (spotted).* *fl.* yellow; petals ovate, acute, glandular. July and August. *l.* whorled, oblong-lanceolate, stalked. *h.* 1ft. Europe and West Asia, 1820. Plant erect. (B. M. 2295, under name of *L. verticillata.*)

L. thyrsiflora (thyrse-flowered). *fl.* yellow, rather small, disposed in dense axillary racemes. Summer. *l.* lanceolate, acute, entire, 3in. long, ¾in. broad at the base. *h.* 1ft. to 2ft. Europe, &c. (Britain). Plant erect. This species thrives best treated as a sub-aquatic. SYNS. *L. capitata, Naumburgia thyrsiflora.* (B. M. 2012; Sy. En. B. 1140.)

L. verticillata (whorled). A synonym of *L. punctata.*

L. vulgaris (common).* Common, or Yellow Loosestrife. *fl.* yellow, in short, terminal, panicled cymes. Summer. *l.* opposite or whorled, ovate or lanceolate, acute, furnished with black glandular dots. Stems erect, branching. *h.* 2ft. to 3ft. Europe, &c. (Britain). (Sy. En. B. 1141.)

LYSINEMA (from *lysis*, freeing, and *nema*, a filament; in reference to the stamens being free). ORD. *Epacrideæ.* A genus of very pretty, greenhouse, evergreen, erect or prostrate shrubs. There are five species, all natives of Australia. Flowers white or pink, axillary, solitary; corolla salver-shaped; tube cylindrical. Leaves erect or spreading, linear-ovate or elliptic. The species described below is the only one introduced. For culture, *see* **Epacris.**

L. pungens (pungent). *fl.* white, or rarely red, sessile in the upper axils. March. *l.* ovate, acuminated, spreading, stem-clasping. *h.* 2ft. to 3ft. New South Wales, &c., 1804. (B. M. 1199, under name of *Epacris pungens.*)

LYSIONOTUS (from *lysis*, loosening, freeing, and *notos*, the back; in reference to the capsule opening with elasticity from the dorsal suture). ORD. *Gesneraceæ.* A genus comprising three (or perhaps four) species of glabrous or pubescent stove herbs, natives of the Himalayas and China. Corolla purplish or pale violet; tube elongated; cymes at the tops of the branches, or in the axils of the upper leaves, long or shortly pedunculate. Leaves ternate, verticillate, membranaceous or coriaceous, toothed or entire. Stems or rhizomes creeping, sub-erect, simple or shrubby-branched. Probably the only species yet introduced is *L. serrata.* This thrives in a peat and loam soil. Propagated, in spring, by divisions; or by seeds, sown in sandy soil, or on a hotbed.

Lysionotus—*continued.*

L. serrata (serrate-leaved). *fl.* pale lavender, with veins of a deeper colour, irregularly funnel-shaped, about 2in. long; corymbs pedunculate, five to ten-flowered. Winter. *l.* oblong-lanceolate, acuminated, coriaceous, serrated, reticulately veined. *h.* 1ft. Sub-tropical Himalayas, 1882. Plant erect. SYN. *L. ternifolia.* (B. M. 6538.)

L. ternifolia (ternate-leaved). A synonym of *L. serrata.*

LYTHRARIEÆ. A natural order of herbs, shrubs, or trees, with variable habit, natives chiefly of tropical America. Flowers hermaphrodite, very rarely unisexual, regular or rarely irregular, solitary in the axils of the leaves, or fascicled or cymose, sometimes spiked or racemed, and accompanied by floral bracteiform leaves, rarely panicled; calyx very often free, persistent, tubular or campanulate, rarely urceolate. Leaves opposite or whorled, rarely opposite and alternate on the same plant, simple, penninerved, entire, petioled or sessile, sometimes glandular dotted, always exstipulate. There are about thirty genera and 250 species. Illustrative genera are: *Cuphea, Grislea, Lythrum.*

LYTHRUM (from *lythron*, black blood; alluding to the colour of the flowers in some species). Loosestrife. ORD. *Lythrarieæ.* A genus comprising about twelve species of hardy or nearly hardy herbaceous plants or small shrubs. Flowers pink, purple, or rarely white, in the axils of the leaves, solitary, or in few-flowered, aggregate cymes. Leaves opposite, rarely verticillate or alternate, linear-oblong or lanceolate, entire. The species are of easy culture in ordinary garden soil, and may be freely increased by divisions. *L. Græfferi* is a very ornamental trailing plant, well adapted for cultivating in hanging pans or baskets for greenhouse decoration in summer. It may readily be increased by cuttings.

L. alatum (winged). *fl.* of a beautiful purple, almost sessile, erect, six-petaled, furnished with two minute bracts. Summer and autumn. *l.* opposite, ovate-oblong, acute, rather cordate at the base, sessile, or nearly so. Branches twiggy, tetragonally winged. *h.* 1ft. to 4ft. North America, 1812. An elegant half-shrubby plant, thriving best in sandy soil. (B. M. 1812.)

L. Græfferi (Græffer's).* *fl.* solitary in the axils of all the upper leaves, shortly pedicelled; calyx ¼in. long; tube slender; lobes twelve; petals longer than the calyx, bright pink. Summer and autumn. *l.* ¼in. to 1in. long, all alternate, or the lower ones opposite, more or less oblong, or linear-oblong. *h.* 1ft. to 3ft. South Europe. (B. M. 6499.)

L. roseum (rose-coloured). A variety of *L. Salicaria.*

L. Salicaria (Willow-like).* Common Purple Loosestrife. *fl.* reddish-purple, in whorled leafy spikes, almost sessile; petals six or seven. July. *l.* opposite, lanceolate, cordate at the base. *h.* 2ft. to 5ft. England. A handsome native perennial, growing freely on the margins of streams and lakes. Its varieties are frequently very desirable, especially *roseum* and *superbum.*

L. superbum (superb). A variety of *L. Salicaria.*

L. virgatum (twiggy). *fl.* purple, in threes, axillary, distinctly pedicellate; panicle twiggy. Summer. *l.* lanceolate, attenuated at the base. *h.* 2ft. to 3ft. Tauria, &c., 1776. Perennial. (B. M. 1003.)

MAACKIA AMURENSIS. *See* **Cladrastis amurensis.**

MABA (its native name in the Tonga Islands). Including *Ferreola.* ORD. *Ebenaceæ.* A genus comprising fifty-nine species of (mostly) hard-wooded, stove, evergreen trees or shrubs, dispersed over the warmer regions of the globe. Flowers dicœcious, rarely monœcious or polygamous, axillary, or at the nodes of the year-old or older branches, solitary or shortly cymose; calyx campanulate; corolla campanulate or tubular; lobes three, rarely four to six, contorted. Leaves alternate, often smaller than in *Diospyros*, rarely large. Mabas thrive in a peat and loam compost. Propagated, during May, by cuttings of half-ripened shoots, placed in sand, under a glass, and in a very gentle bottom heat. Probably the undermentioned are the only species introduced.

M. buxifolia (Box-leaved). *fl.* yellowish, solitary or aggregate. *l.* obovate, glabrous in the adult state. *h.* 1½ft. Tropical Asia and Africa, 1810.

Maba—*continued.*

M. laurina (Laurel-like). *fl.* yellow, solitary. July. *l.* oval-oblong, veiny, bluntish at the base, shining. *h.* 3ft. Queensland, 1824.

MACADAMIA (named after John Macadam, M.D., Secretary of the Philosophical Institute of Victoria). ORD. *Proteaceæ.* A small genus (two species) of greenhouse evergreen trees or tall shrubs, confined to Eastern Australia. Flowers pedicellate, in pairs, in simple, terminal or axillary racemes; perianth regular or slightly irregular. Leaves verticillate, entire or serrated. For culture, *see* **Hakea.**

M. ternifolia (ternate-leaved).* *fl.* not showy, in a long-stalked raceme. *fr.* a kind of drupe, with a fleshy exterior, encircling a hard shell, like a Walnut; it contains, at maturity, a kernel of a remarkably rich and agreeable flavour, resembling, although much superior to, the Filbert. *l.* in whorls of three or four, short-stalked, leathery, shining, oblong or oblong-lanceolate, entire or dentate at the margin, from 4in. to 12in. long. *h.* 30ft. 1869. Tree. (G. C. 1870, 1181.)

MACHÆRANTHERA. This genus is now included under *Aster.*

MACHÆRIUM (from *machaira*, a sabre; in allusion to the pods ending in a sabre-shaped wing, which is longer than the fruit). ORD. *Leguminosæ.* A genus comprising nearly sixty species of stove erect trees or tall climbing shrubs, natives of tropical America. Flowers purple, violet, or white, small or mediocre, disposed in short, side-flowering racemes, fasciculate in the axils, or in terminal crowded panicles; calyx truncate, obtuse at base, shortly toothed; standard broadly ovate or orbiculate, exappendiculate, often silky outside; wings oblong, frequently falcate; keel incurved, the petals connate at back; pedicels short, sometimes very short. Pod compressed, samara-like, indehiscent. Leaves impari-pinnate; leaflets mostly alternate, exstipellate; stipules sometimes hard-bristly; bracts small; bracteoles persistent. Some of the species are supposed to yield a part of the rosewood of commerce. Machæriums grow well in a compost of loam and peat. Propagation may be effected by cuttings, made of the ripened wood, and inserted in sand, under a glass, in heat. The undermentioned are probably the only species introduced; they are usually, but erroneously, classed as Nissolias. Both are climbing shrubs.

M. aculeatum (prickly). *fl.* white; panicles short, darkly pubescent; standard silky; keel much shorter than the wings. August. *l.*, leaflets thirty-one to forty-five, narrow-oblong, about ½in. long, obtuse or retuse, shining, slightly pilose beneath, coriaceous; stipules at length hard-spinescent. *h.* 10ft. Rio Janeiro, 1824.

M. robiniæfolium (Robinia-leaved). *fl.* white, disposed in axillary, many-flowered racemes, which are shorter than the leaves; keel slightly rostrate; calyx somewhat glabrous. July. *l.*, leaflets about twenty or thirty, oblong, obtuse, mucronulate, very glabrous; stipules spinescent. *h.* 6ft. St. Vincent, 1824.

MACKAYA (named after Dr. J. F. Mackay, author of the "Flora Hibernica"). ORD. *Acanthaceæ.* A monotypic genus, now included, by Bentham and Hooker, under *Asystasia. M. bella* is a beautiful greenhouse plant, which grows very freely, but requires special treatment to induce it to flower profusely. A knowledge of its habit and mode of flowering is of material assistance, if not indispensable, for attaining success in its cultivation. Essential points are the encouragement of a free growth throughout the summer, in an airy, light structure, and the allowance of a season of rest in winter, during which time no water should be applied to the roots, or overhead. The plant is nearly, or quite, deciduous, and the racemes of flowers are produced from the points of nearly all well-ripened shoots. Cuttings root readily, during summer, in any close frame; and young plants, thus obtained, should be grown on as rapidly as possible until the approach of winter. An occasional pinching will encourage a bushy habit, and cause new shoots to proceed from the base of the plant. Plenty of water, and frequent syringings, should be applied in the growing season, and a position afforded,

Mackaya—*continued.*

in a house or frame, where plenty of light and air may be admitted. Under such treatment, compact little plants, in 5in. pots, may be obtained by November. These should be kept quite dry until April, when they may be cut back and started in preparation for flowering the following year. When new growth begins, the plants should be transferred into 8in. pots, using a somewhat rough, rich soil, composed of about two parts loam to one of dried cow-manure. Another potting into 10in. sizes may be given in due course, and plants grown in them 3ft. high, by autumn. Dry off as before, and encourage the flowers to expand gradually, in spring, in a temperature of about 60deg., and, when they commence opening, the plants should be transferred to a greenhouse which is some 10deg. cooler. It is important that the wood be thoroughly ripened, and all the points preserved until flowering is past, when similar treatment may be again given, if desired for the next year. It is, however, advisable to propagate and prepare a few new ones each season, to preserve a stock of healthy young plants. Brown Scale is frequently very troublesome; it must be removed from the stems or leaves by sponging with rather strong soft-soap water or some other insecticide.

M. bella (handsome).* *fl.* pale lilac, nearly 2in. long, campanulate, with two of the four stamens barren; throat ornamented with most delicately-pencilled, reticulated, purple veins; racemes many-flowered, 4in. to 6in. long. May. *l.* ovate-oblong, sinuately toothed. Branches virgate. *h.* 6ft. Natal, 1869. (B. M. 5797.)

MACLEANIA (named after John Maclean, of Lima, a British merchant, and a distinguished patron of botany). ORD. *Vacciniaceæ*. A genus comprising about a dozen species of ornamental, glabrous or rarely puberulous, greenhouse shrubs, inhabiting the Andes of America, from Peru to Mexico. Flowers showy, solitary, corymbose, or in axillary fascicles; corolla cylindrical, with a five-toothed limb; anthers one-celled. Leaves alternate, shortly petiolate, entire, persistent. For culture, *see* **Thibaudia.**

M. angulata (angled). *fl.* in threes from the axils, pedunculate; corolla bright red, 1in. long, with a yellow limb; calyx angled. June. *l.* alternate, ovate, entire, obtuse, on short petioles; those on the young shoots tinged with red. *h.* 3ft. Peru, 1842. A beautiful evergreen shrub. (B. M. 3979.)

M. longiflora (long-flowered). *fl.* borne in threes from the axils; corolla red, angular, with a yellow limb. May. *l.* sessile, oval-oblong, obtuse. *h.* 5ft. Peru, 1844. (B. R. xxx. 25.)

M. pulchra (beautiful).* *fl.* yellow, with bright deep scarlet tubes, large, pendulous, produced in clusters upon a short axillary peduncle. April. *l.* oblong, obtuse at the base, slightly acuminated, deep shining green, beautifully tinged with red when young. New Grenada, 1874. A handsome plant, with long, drooping branches. (B. M. 5465.)

M. punctata (dotted). *fl.* pedunculate, crowded in the upper axils; corolla rose-red, 1in. long, swollen in the lower half; the upper part white, tinged with yellow; calyx turbinate, deep red. November. *l.* alternate, inclining to secund, cordate, sessile or shortly petiolate; upper ones nearly oval, glossy, dotted. Ecuador, 1848. A low shrub. (B. M. 4426.)

M. speciosissima (very showy).* *fl.* brilliant scarlet, with yellow points, upwards of 1in. long, tubular, pendulous, produced freely in axillary clusters. Early spring. *l.* somewhat oblong, obtuse, finely tinged with red when young. Columbia, 1854. This beautiful shrub is not of compact habit, and should be suspended from the roof, or grown upon a shelf, so that its branches may hang downwards. (B. M. 5453.)

MACLEAYA YEDOËNSIS. *See* **Bocconia cordata.**

MACLURA (named in honour of W. Maclure, a North American naturalist, who died in 1840). ORD. *Urticaceæ*. A monotypic genus. The species is a hardy, deciduous, milky-juiced tree. For culture, &c., *see* **Morus.**

M. aurantiaca (golden).* Bow-wood; Osage Orange. *fl.* yellowish-green, inconspicuous. *fr.* from 3in. to 5in. in diameter, bright golden-yellow. *l.* ovate, acuminate, bright shiny green, cuspidate, 3in. to 3½in. long, and 2in. broad. *h.* 20ft. North America, 1818. An excellent plant for forming hedges, being armed with stout spines.

M. tricuspidata (three-cusped). *fl.* axillary. *l.* three-lobed

Maclura—*continued.*

while young, roundish-ovate in adults. China, 1872. An ornamental, hardy, deciduous tree, remarkable from its juvenile (non-flowering) state (see Fig. 496) exhibiting such a contrast to the adult (flowering) state (see Fig. 497, page 313). This plant is *Cudrania triloba*; but, as it was omitted in Vol. I. of this work, and is so well known under the name given it by Carrière it is included here. In China, the leaves are used for feeding silk-worms, and the wood yields a yellow dye.

FIG. 496. BRANCH, IN JUVENILE STATE, OF CUDRANIA TRILOBA (MACLURA TRICUSPIDATA).

MACODES (from *makos*, length; in reference to the shape of the labellum). ORD. *Orchideæ*. A monotypic genus. The species is a stove orchid, closely allied to **Anœctochilus** (which *see* for culture).

M. Petola (Petola). *fl.* greenish, small, externally clothed with glandular pubescence. *l.* oval, 2in. to 3in. long, and 2in. broad, clouded on the upper surface, and elegantly marked with netted golden veins. Java, 1859. A very beautiful little plant, of which there are two forms. (R. X. O. 96, Fig. 1.)

MACRADENIA (from *makros*, long, and *aden*, a gland; referring to the long process of the pollen-masses). SYN. *Rhynchadenia*. ORD. *Orchideæ*. A genus comprising only two or three species of stove epiphytal Orchids, confined to the West Indies, and differing from *Oncidium* in mere technical details. They are rather more curious and interesting than beautiful. For culture, *see* **Oncidium.**

M. Brassavolæ (Brassavola).* *fl.*, sepals and petals cinnamon, margins ochre-coloured; lip trifid, side lobes rhomboid, middle very large, cuspidate, white, with purple streaks, with yellow borders to the side lobes; peduncle densely-flowered. *l.* one or two, oblong, acute, 5in. long, ½in. broad. Columbia, 1864.

M. lutescens (yellowish). *fl.* dingy yellow, spotted with brownish-purple; lip undivided, cucullate-concave, taper-pointed; peduncle four or five-flowered. November. *l.* solitary. Trinidad, 1821. (B. R. 612.)

MACRANTHUS. Included under **Mucuna** (which *see*).

MACROCHLOA. Included under **Stipa** (which *see*).

MACROCNEMUM (from *makros*, long, and *kneme*, a leg; in reference to the long flower-stalks). SYN. *Lasionema*. ORD. *Rubiaceæ*. A genus comprising about nine species of stove trees and shrubs, inhabiting tropical America and the West Indies. Flowers white or pink,

Macrocnemum—*continued.*

in axillary and terminal panicles; pedicels bracteolate; corolla funnel-shaped or salver-formed; tube sub-elongate. Leaves opposite, petiolate. The only species yet introduced is the one here described. For culture, *see* **Catesbæa.**

M. jamaicense (Jamaica). *fl.* greenish-white, scented; corymbs on long peduncles. *l.* oblong-oval, petiolate, polished. *h.* 10ft. to 15ft., or sometimes a tree 30ft. high. Jamaica, 1806.

MACROGLOSSA STELLATARUM, or **HUMMING-BIRD HAWK MOTH.** This moth is of interest to gardeners, chiefly because of the part it plays in fertilising the young seeds in Honeysuckle and other plants in which the flowers have long, narrow tubes. In such flowers, the honey, which is the lure for insect visitors, is at the bottom of the tube, and is within reach only of those insects that have a long proboscis. Through this organ the honey is sucked up, but, to reach the latter, the head has to be thrust deep into the flower; and, in doing this, the insect carries off some of the pollen on its head or back. The parts thus dusted with pollen are almost certain to touch the stigma of the next flower visited; and the pollen grains adhere readily to the sticky surface of the stigma, whereon the insect's share in the work of fertilisation is completed. Some idea of the size, form, and markings of *M. stellatarum* may be formed from Fig. 498. The front wings are smoky, with a black central dot, and dark cross-bars. The hind wings are orange-coloured, with the base and margin dark. The

FIG. 497. BRANCH AND FRUIT, IN ADULT CONDITION, OF CUDRANIA TRILOBA (MACLURA TRICUSPIDATA, see page 312).

FIG. 498. MACROGLOSSA STELLATARUM.

Macroglossa stellatarum—*continued.*

body is of a smoky hue, with black and white spots on the hinder part, where also there are black and white tufts on the sides, and a tuft of black hairs at the end of the body. These tufts are spread during flight, considerably increasing the apparent breadth of the body. The flight is very rapid, the moth dashing from flower to flower, remaining poised on the wing before each, while it sucks out the nectar, and unconsciously transfers the pollen from flower to flower. In mode of flight, in the loud humming noise that it emits while poised before a flower, and even in its general appearance, it so much resembles a Humming Bird as to well deserve the popular name of Humming-bird Hawk Moth. Like the bird named, it flies only by day, and most actively during bright sunshine, in this respect differing from most of the group of Hawk Moths. The caterpillar, like those of other Hawk Moths, has a slender, sharp horn on the end of the body, resembling a short, erect tail. It is green, or pinkish-brown, sprinkled with white; the sides are bluish, with two dull white or pinkish lines along each. The caterpillar feeds on Lady's Bedstraws (*Galium*) of different kinds, and cannot be said to do any damage in gardens. When full fed, it burrows underground, and turns into a brown chrysalis.

MACROMERIA (from *makros*, large, and *meris*, a part; the flowers of this genus are the largest in the whole family). ORD. *Boragineæ.* A genus comprising about eight species of half-hardy perennial herbs, natives of Mexico, Columbia, and Peru, allied to *Onosmodium* and *Lithospermum*, from the latter of which it is distinguished by the exserted stamens, and by having the corolla with a long tube, dilated at the throat. Racemes terminal, few-flowered, bracteate. Leaves alternate, sessile, lanceolate. *M. exserta* is probably the only species yet introduced. For culture, *see* **Lithospermum.**

M. exserta (exserted). *fl.* yellow, racemose; style and stamens much exserted. Autumn. *l.* lanceolate, mucronate, scabrous. *h.* 3ft. Mexico, 1846. (B. R. 1847, 26.)

MACROPIPER. Included under **Piper** (which *see*).

MACROPLETHUS. Included under *Acrostichum.*

MACROS. A Greek term, which, used in compounds, signifies long, and sometimes large.

MACROSIPHON. A synonym of **Hindsia** (which *see*).

MACROSTYLIS (from *makros*, long, and *stylos*, a style; style very long). ORD. *Rutaceæ.* A genus comprising eight species of pretty, greenhouse, evergreen shrubs, indigenous to South Africa. They are closely allied to *Diosma.* Flowers sub-umbellately aggregate at the tips of the branches; peduncles short, bracteate at base. Leaves scattered, alternate, and opposite, dotted, somewhat keeled. For culture, *see* **Agathosma.**

M. barbigera (beard-bearing). *fl.* reddish, with a white beard; corymbs terminal, almost sessile. April. *l.* opposite, cordate, stem-clasping, acute. *h.* 1ft. to 2ft. 1826.

M. squarrosa (squarrose). *fl.* reddish; petals longer than the calyx. May. *l.* crowded, ovate or ovate-oblong, obtuse, much-spreading. *h.* 1ft. to 2ft. 1774. SYN. *Diosma obtusa.*

MACROTROPIS. This genus is included under **Ormosia** (which *see*).

MACROZAMIA (from *makros*, long, and *Zamia*, to which it is closely allied). Including *Catakidozamia* and *Lepidozamia.* ORD. *Cycadaceæ.* A genus comprising about seven species of greenhouse evergreen perennials, restricted to tropical and temperate Australia. Cones of both sexes ovoid, oblong, or cylindrical, or females rarely nearly globular; scales hard, thickened at apex, with an erect, spreading, or rarely recurved point, either broad and short or elongated and narrow; scales of females with one pendulous ovule on each side. Leaves and trunk similar to *Cycas*, except that the pinnæ have no midrib, and are striate with parallel veins. The species thrive in a compost of two parts well-drained sandy loam and one of peat. For general culture, *see* **Zamia.**

M. corallipes (red-stalked).* *l.* forming a very contracted crown, and diverging below, then sub-erect; petiole deep green, smooth, but not polished, reddish-brown towards the base; pinnæ about fifty pairs, 5in. to 7in. long, ¼in. broad, very narrow, linear-lanceolate, acute, but hardly pungent, dark green, with a bright red petiolule. Trunk sub-spherical. 1872. A very remarkable and ornamental plant. Probably a form of *M. spiralis.* (B. M. 5943.)

M. cylindracea (cylindric). *l.* dark green, pinnate, coriaceous; pinnæ glossy on the surface, each being marked at the base with a large ivory-white patch, which strongly contrasts with the dark green midrib lying between the two rows of ivory markings. Stem with a long neck. 1874. Distinctly and well marked, but probably a form of *M. spiralis.*

M. Denisonii (Denison's). A synonym of *M. Perowskiana.* The same name is sometimes applied, in gardens, to *M. P. Hopei.*

M. Fraseri (Fraser's).* *l.* pinnate, pendulous, 6ft. to 8ft. long; pinnæ linear, tapering to a fine spiny point, swollen at the base, forming a joint or umbo, light green or greenish-white, about 6in. long, and scarcely ¼in. broad; upper surface almost black-green, the under side dark green. Stem about 4ft. or 5ft. in circumference. 1846. A very handsome and distinct species.

M. Mackenzii (Mackenzie's). *l.* ovate in outline, with numerous pairs of narrow tapering segments of a dark green colour, and from 9in. to 10in. in length; base of petiole covered with loose floccose wool; rachis strongly convex behind, slightly so in front, with the segments of the central portion set on at about ¼in. apart, the upper ones being more closely, and the lower ones more distantly, placed. 1877. (G. C. n. s., vii. 665.)

M. Macleayi (Macleay's). A synonym of *M. Perowskiana.*

M. Miquelli (Miquell's). *l.* 2ft. to 4ft. long; base of petiole loosely woolly; upper surface of rachis flat, and often ½in. broad in the lower part; pinnæ straight or falcate, contracted and callous at base and their insertion at the rachis marginal, the lowest often reduced to small teeth. *male cones* cylindrical, 6in. to 8in. long, 2in. to 2½in. thick. *female cones* about as long and thicker, the scales fewer.

M. Perowskiana (Peroffski's).* *l.* dark green, ovate, horizontal, on long stalks, linear, decurved, acuminate. Trunk stout, short, scaly, supporting a crown of leaves. 1870. This species is only known to us in its young state, but has the appearance of being most desirable and beautiful. SYNS. *M. Denisonii, M. Macleayi, Catakidozamia Macleayi,* and *Lepidozamia Peroffskiana.* (R. G. t60.)

Macrozamia—*continued.*

M. P. Hopei (Hope's). *l.* pinnate, 3ft. to 6ft. long; pinnæ entire, linear, 6in. to 12in. long, scarcely 1in. broad, dark green above, tinged with red at the base, paler below; petioles glaucous when young. Stem slender, about 1ft. in diameter in mature plants. 1865. A noble variety, attaining a height of 60ft. in its native country; but it is of very slow growth, and does not rapidly form a stem. SYNS. *M. Denisonii* (of gardens) and *Catakidozamia Hopei.*

M. plumosa (plumed).* *l.* erect, spirally-twisted, from 2ft. to 2½ft. long, furnished nearly to the base with narrow-linear leaflets, which are set on at intervals of about ¼in., and are from 6in. to 8in. long; petiole flattened. Stem small, ovate with woolly scales. 1874. A very beautiful plant, remarkable for its distinct and elegant character. (G. C. n. s., iii. 653.)

FIG. 499. MACROZAMIA SPIRALIS.

M. spiralis (spiral). *l.* pinnate, 1ft. to 3ft. long; pinnæ linear, bright shining green, except at the base, where they are ivory-white, forming a broad central white stripe. A very handsome plant, known to us only in its young state. See Fig. 499.

MACULATE. Spotted or blotched.

MADAGASCAR NUTMEG. *See* **Agathophyllum.**

MADARIA. Included under **Madia** (which *see*).

MADAROGLOSSA. A synonym of **Layia** (which *see*).

MADDER. The root of **Rubia tinctorum.**

MADIA (the Chilian name of *M. sativa*). SYN. *Biotia.* Including *Madaria.* ORD. *Compositæ.* This genus comprises about eight species of hardy, annual, erect herbs, natives of North-west America and Chili. Flower-heads yellow, sessile or pedunculate at the apices of the branches, solitary, clustered, or loosely paniculate; involucre ovoid or campanulate. Leaves alternate, entire or merely toothed. The species will thrive in any ordinary garden soil. Propagated by seeds, sown in spring.

M. elegans (elegant).* *fl.-heads* yellow; disk-florets bearded in the limb; receptacle conical, pilose. August. *l.* linear or lanceolate, mostly entire. Stems diffuse. *h.* 1½ft. North-west America, 1831. (B. M. 3548; B. R. 1458.)

M. sativa (cultivated). *fl.-heads* yellow. July. *l.*, lower ones opposite, entire; upper ones alternate. *h.* 1ft. Chili, 1794.

M. viscosa (clammy). *fl.-heads* yellow; outer involucres ten-leaved. July and August. *l.* lanceolate, sessile, viscid. *h.* 1½ft. Chili, 1794. (B. M. 2574.)

MADWORT. *See* **Alyssum.** The name is also given to *Asperugo.*

MÆRUA (said to be derived from *Meru*, the Arabian name). ORD. *Capparideæ.* A genus comprising about half-a-score species of stove or greenhouse, unarmed, often glaucous shrubs, natives of tropical Africa, Arabia, and the West Indies. Flowers axillary or terminal, solitary, corymbose, or racemose; calyx funnel-shaped, with a persistent tube and four lobes, valvate, deciduous; petals none, or four, inserted at the mouth of the calyx. Leaves simple, entire; petioles articulated with the branches; stipules small. The undermentioned species, which is probably the only one in cultivation,

Mærua—*continued.*

thrives in a compost of loam and peat. Cuttings of nearly ripened wood will root in sand, under a glass, in heat.

M. oblongifolia (oblong-leaved). *fl.* white, terminal, in simple depressed racemes; petals shorter than the calyx lobes, oblong-linear, acuminate. June. *l.* oblong-lanceolate, very obtuse and mucronulate at the apex, glaucescent, shortly petiolate, 1¼in. to 2½in. long, nearly ½in. broad. *h.* 4ft. Abyssinia, 1822. Stove. SYNS. *Capparis heteroclita* and *Niebuhria oblongifolia.*

MÆSA (from *maas*, the Arabic name of one of the species). SYN. *Bæobotrys.* ORD. *Myrsineæ.* A genus of about thirty-five species of stove evergreen shrubs, natives of the tropical and sub-tropical regions of the Old World. Flowers white, small; racemes usually axillary, simple or branched, many-flowered; pedicels bracteate at base. Leaves entire, dentate or serrate, often full of pellucid dots. Probably the species here described is the only one now in cultivation. For culture, &c., *see* **Ardisia.**

M. indica (Indian). *fl.* numerous, in axillary and terminal racemes. November. *l.* from ovate to lanceolate, coarsely serrated, 3in. to 6in. long. *h.* 5ft. to 6ft. India, 1817. (B. M. 2052, under name of *Bæobotrys indica.*)

MAGNOLIA (named after Pierre Magnol, 1638-1715, Professor of Medicine, and Prefect of the Botanic Garden at Montpellier). ORD. *Magnoliaceæ.* This genus comprises about twenty species of elegant ornamental greenhouse or hardy evergreen or deciduous trees and shrubs, of which thirteen are natives of Japan, China, and the Himalayas, and the rest are North American. Flowers conspicuous, solitary, terminal; petals six to twelve, in two or more series. Leaves large, entire. Magnolias are readily increased by layering; also by seeds, which should be sown, so soon as ripe, in a frame and kept moderately moist until they germinate. Veneering and side-cleft grafting are also practicable in July and August; the stocks operated upon being placed in

FIG. 500. FLOWER AND LEAVES OF MAGNOLIA CONSPICUA.

a close frame until a union is effected. *M. conspicua* is one of the earliest and most beautiful of outside flowering trees. It, as well as several other species, should be provided with a sheltered situation, especially in the colder parts of the country. *M. acuminata* is, perhaps, the hardiest species of the genus, and forms a fine large tree. *M. grandiflora* is well adapted for planting against the wall of a house where there is a considerable space to be covered; its massive evergreen leaves and large white blossoms being especially distinct and attractive in late summer and autumn. The flowers of the majority of Magnolias emit an agreeable and strong perfume. Those of *M. fuscata*, an evergreen slow-growing greenhouse species, are very powerfully scented

Magnolia—*continued.*

when the sun shines, one or two flowers being sufficient to perfume a large house. *M. glauca*, a very desirable small-flowered hardy shrubby species, is also agreeably scented. Magnolias succeed best in warm positions, and in a moderately rich soil, which should be of a free, open texture. They are somewhat impatient of root disturbance.

M. acuminata (acuminated).* Cucumber-tree. *fl.* glaucous-green, tinged with yellow, 3in. to 4in. in diameter, scarcely scented, petals six to nine. May to July. *fr.* about 3in. long, when young somewhat resembling a small cucumber. *l.* oblong, acuminate; under surface pubescent. *h.* 30ft. to 60ft. North America, 1736. A large, vigorous, hardy, deciduous tree, with spreading branches. (B. M. 2427; L. B. C. 418.)

M. auriculata (eared). A synonym of *M. Fraseri.*

FIG. 501. FLOWERING BRANCHLET OF MAGNOLIA GLAUCA.

M. Campbellii (Campbell's). *fl.* pale rose inside, crimson outside, slightly fragrant, 6in. to 10in. in diameter. April. *l.* large, ovate-lanceolate, silky hairy beneath. Sikkim, 1868. A very handsome deciduous tree in its native habitat, but not sufficiently hardy to withstand our winters, except in the most favoured spots. It flowered outside in the South of Ireland in 1883, and again in 1885.

M. conspicua (conspicuous).* The Yulan. *fl.* white, sometimes suffused with purple, expanding during the day, very fragrant, erect, produced in great profusion; petals six to nine. February to May. *l.* obovate, abruptly acuminated, younger ones pubescent, expanding after the flowers. *h.* 20ft. to 50ft. China, 1789. A well-known and handsome hardy deciduous tree, of which there are one or two varieties in cultivation. SYN. *M. Yulan.* See Fig. 500. (B. M. 1621.)

M. c. Soulangeana (Soulange's). Probably a natural hybrid between *M. conspicua* and *M. obovata*; it has the large flowers of the former, and the purple-tinted petals of the latter species. France. (B. R. 1164, under name of *M. Yulan Soulangeana*, and S. B. F. G. 260, under name of *M. Soulangeana.*)

M. c. S. nigra (black). A form with still darker flowers.

M. cordata (cordate). *fl.* yellow, lined with purple, erect, about 4in. in diameter, scentless; petals six to nine, oblong. April to July. *l.* heart-shaped, somewhat ovate, acute, from 4in. to 6in. long; under surface tomentose, upper surface smooth. *h.* 40ft. to 50ft. North America, 1801. Hardy deciduous tree. (L. B. C. 474.)

M. Fraseri (Fraser's). Long-leaved Cucumber-tree. *fl.* yellowish-white, erect, 3in. to 4in. in diameter, very sweet-scented; petals nine, oblong. April. *l.* 1ft. or more long, smooth, under surface somewhat glaucous, spathulately-obovate, cordate at the base, with blunt, approximate auricles. *h.* 30ft. to 50ft. North America, 1786. A bold and imposing hardy deciduous species, with spongy wood. SYN. *M. auriculata.* (A. B. R. 573; B. M. 1206.)

M. fuscata (brown-stalked).* *fl.* dull purple, very fragrant, small, erect. April. *l.* elliptical-oblong, adult ones smooth, younger ones, as well as branches and petioles, covered with brown tomentum. *h.* 2ft. to 4ft. China, 1789. A greenhouse evergreen shrub. (A. B. R. 229; B. M. 1008.)

M. glauca (glaucous).* *fl.* white, very fragrant, about 3in. in diameter; petals nine to twelve, ovate, concave. May to July. *l.* elliptical, obtuse, under surface glaucous. *h.* 15ft. North America, 1688. A very desirable hardy evergreen shrub. See Fig. 501. (L. B. C. 215.)

Magnolia—*continued.*

M. g. major (larger). A form of vigorous habit, with leaves and flowers two or three times larger than those of the type. SYN. *M. Thompsoniana*, of gardens. (B. M. 2164.)

FIG. 502. FLOWERING BRANCHLET OF MAGNOLIA GRANDIFLORA.

M. grandiflora (large-flowered).* *fl.* white, sweet-scented, large, from 6in. to 8in. in diameter, erect; petals nine to twelve. Summer. *l.* oval-oblong, coriaceous, upper surface shining, under surface rusty. *h.* 70ft. to 80ft. North America, 1737. A handsome stately hardy evergreen tree, branching, and forming a fine pyramidal head. See Fig. 502. (A. B. R. 518.) There are numerous varieties, differing from the type in the shape of the leaves; they are not, as a rule, of much importance.

M. Halleana (Hall's). A synonym of *M. stellata.*

M. macrophylla (large-leaved).* *fl.* white, purple at the base, sweet-scented, 8in. to 10in. in diameter; petals six to nine, ovate, June. *l.* very large, 1ft. to 3ft. long, 8in. to 10in. broad, oblong-obovate, somewhat panduriform, cordate at the base, under surface whitish-glaucous. *h.* 30ft. North America, 1800. A very handsome hardy deciduous tree, with white smooth bark. (B. M. 2189.)

M. obovata (obovate). *fl.* purple outside, white within, large, tulip-shaped, fragrant; petals six. April. *l.* large, obovate, dark green. *h.* 6ft. Japan, 1790. A very pretty, small, hardy, deciduous shrub.

M. o. discolor (two-coloured). A form with larger flowers than the type. (B. M. 390, under name of *M. purpurea.*)

M. parviflora (small-flowered).* *fl.* white, rosy-tinted, almost globular. Spring. *l.* round-ovate, cuspidate; petioles and principal nerves covered with short reddish pubescence beneath. A hardy deciduous shrub. Japan. (Gn. Dec. 8, 1883.)

M. purpurea (purple). A synonym of *M. obovata discolor.*

M. stellata (starry).* *fl.* white, 3in. in diameter, sweet-scented; sepals shorter than petals, oblong, hairy outside; petals reflexed, narrow, linear-oblong, obtuse; anthers yellow, shorter than the green pistil. March to May. *l.* deciduous, varying from obovate obtuse to elliptic and shortly acuminate, membranous, 2in. to 5in. long. Japan. A pretty tree, flowering before the leaves fully develop. SYN. *M. Halleana.* (B. M. 6370.)

M. Thompsoniana (Thompson's), of gardens. A synonym of *M. glauca major.*

M. tripetala (three-petaled). A synonym of *M. Umbrella.*

M. Umbrella (umbrella).* Umbrella-tree. *fl.* white, with a slight but not altogether agreeable perfume, 4in. to 6in. in diameter; petals nine to twelve, exterior ones pendent. Spring. *l.* lanceolate, 1ft. to 2ft. long, spreading, adult ones smooth, younger ones pubescent underneath. *h.* 35ft. North America, 1752. A free-growing and somewhat straggling hardy deciduous tree. SYN. *M. tripetala.*

MAGNOLIACEÆ. An order of trees or shrubs, natives of tropical and Eastern Asia, North America, rare in tropical and extra-tropical South America; none

Magnoliaceæ—*continued.*

have yet been found in Africa, and very few in Australia and New Zealand. Flowers axillary or terminal, solitary or rarely sub-fasciculate, often showy, hermaphrodite, or, in a few genera, unisexual. Fruit of numerous dry or succulent, dehiscent or indehiscent, carpels. Leaves alternate, undivided, reticulately penni-nerved, entire or dentate. Magnoliaceæ possess bitter, tonic, and aromatic qualities. There are about nine genera and seventy species. Examples: *Drimys, Illicium, Liriodendron,* and *Magnolia.*

MAGPIE MOTH. *See* **Gooseberry or Magpie Moth.**

MAHALEB. *See* **Cerasus Mahaleb.**

MAHARANGA. Now included under **Onosma** (which *see*).

MAHERNIA (an anagram of *Hermannia,* to which it is closely allied). ORD. *Sterculiaceæ.* A genus comprising thirty-three species of very pretty greenhouse evergreen herbs or sub-shrubs, all natives of extra-tropical and Southern Africa, distinguished from the allied genus *Hermannia* in the filaments of the stamens being dilated in the middle. The species, only a few of which are in cultivation, are of easy culture in a light compost of equal parts loam, peat, and leaf mould, to which may be added a little sand. The plants soon acquire a straggling habit, unless the young shoots are frequently stopped in order to produce a lateral growth. Propagated freely, during summer, by cuttings of young shoots, 1in. to 2in. long, inserted in sandy soil, under a glass.

FIG. 503. FLOWERING BRANCH OF MAHERNIA GLABRATA.

M. glabrata (smooth). *fl.* yellow, drooping, rather large, with a Jonquil-like fragrance; peduncles two-flowered, very long. April to June. *l.* lanceolate, distantly pinnatifidly toothed, roughish from dots and stellated down; stipules ovate, mucronate. *h.* 1ft. to 2ft. Cape of Good Hope, 1789. Sub-shrub. See Fig. 503. (A. B. R. 85.)

M. incisa (cut-leaved).* *fl.* deep crimson in the bud, inclining to a deep orange as they open, and finally becoming yellowish; peduncles usually two-flowered. July and August. *l.* incisio-pinnatifid, covered with glandular, stellate, and simple down. *h.* 2ft. to 4ft. Cape of Good Hope, 1792. Shrub. (B. M. 353.)

MAHOGANY-TREE. *See* **Swietenia Mahagoni.**

MAHONIA. Included under **Berberis** (which *see*).

MAHUREA (its native name). SYN. *Bonnetia.* ORD. *Ternstræmiaceæ.* A small genus (four species) of South American stove evergreen trees. Flowers pink, disposed in narrow terminal panicles; sepals five, imbricated; petals five, contorted. Leaves alternate, often petiolate. Only one species has yet been introduced.

Mahurea—*continued.*

It thrives in a compost of sandy peat and fibry loam. Propagated, during summer, by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in gentle bottom heat.

M. palustris (marsh-loving). *fl.* purplish, terminal, racemose, hardly 1in. in diameter. May. *l.* oblong, coriaceous, entire, full of pellucid dots. *h.* 15ft. 1820.

MAIANTHEMUM (from *maios*, May, and *anthemon*, a blossom; in allusion to the flowering period of the plant). SYNS. *Bifolium*, *Maia*, *Sciophylla*, and *Styrandra*. ORD. *Liliaceæ*. A monotypic genus, the species being a hardy erect, glabrous or puberulous, bulbous plant, with a slender, creeping rootstock. For culture, *see* **Smilacina.**

M. bifolium (two-leaved). *fl.* white; perianth scarcely one line long; raceme somewhat dense, twelve to thirty-flowered; pedicels solitary or twin, very slender, articulated at apex. May. *l.* two, placed above the middle of the stem, petiolate, cordate-ovate, membranous, persistent, 2in. to 3in. long, acute, costate, thickly veined. *h.* 4in. to 8in. North temperate regions (Britain). SYNS. *Convallaria bifolia* (B. M. 510; F. D. 291), *Smilacina bifolia*, and *S. canadensis*.

MAIDENHAIR. The common name for **Adiantum Capillus-Veneris** (which *see*).

MAIDENHAIR-TREE. *See* **Ginkgo.**

MAIDEN PINK. *See* **Dianthus deltoides.**

MAIDEN PLUM. *See* **Comocladia.**

MAIDEN TREE. A term applied to an untrained fruit tree the first year after being worked.

MAIRIA (so called after Professor le Maire, of Ghent, who collected this plant at the Cape). ORD. *Compositæ*. A genus containing ten species of half-hardy or greenhouse herbs or sub-shrubs, all natives of South Africa. Flower-heads intermediate or rather large; ray-florets purplish, rose, or pink; disk-florets yellow; involucre campanulate or hemispherical; receptacle flat, naked. Leaves radical or alternate. The species succeed in a compost of turfy loam and peat, and require an abundance of moisture at nearly all times. Propagated, in spring, by divisions; or by seeds, sown in a cold frame. Probably the only species yet introduced is the one here described.

M. crenata (scolloped). *fl.-heads* solitary, 1in. to 1½in. in diameter, with a bright purple ray and a yellow disk; scape rising from 1in. to 6in. from the centre of the rosette. April. *l.* in a dense rosette, deep green, fleshy, oblong-ovate in outline, tapering at the base into a petiole; margins distantly toothed. Plant stemless. 1820. Greenhouse or half-hardy. (B. R. 855, under name of *Gerberia crenata*.)

MAIZE. *See* **Zea Mays.**

MAJORANA. Included under **Origanum** (which *see*).

MALABAILA (named after Count Malabaila von Canal, a former Director of the Botanic Gardens at Prague). SYN. *Leiotulus*. ORD. *Umbelliferæ*. A genus comprising about half-a-score species of hardy perennial, often glabrous herbs, similar in habit to *Peucedanum*, but with broader leaves. They are natives of South-eastern Europe, Eastern Africa, and Western Asia. Flowers yellowish, in compound, many-rayed umbels; calyx teeth obsolete or minute; petals rather broad, acuminate, inflexed (often obtuse or retuse). Involucral bracts few or none. Fruit orbiculate or rarely obovate, flat, compressed. Leaves pinnate or pinnately decompound; segments often broad, incised-toothed. Seeds of the undermentioned species should be sown in the open ground, in spring.

M. Opoponax (Opoponax). *fl.*, petals roundish, entire, involute; styles very short. June and July. *fr.* girded by a dilated, convex margin. *l.* bipinnate; leaflets unequally cordate, crenated, obtuse, hairy, especially beneath. Sheaths at the flowering branches spathaceous, and sometimes destitute of leaves. *h.* 6ft. South Europe, 1640. SYNS. *Opoponax Chironium*, *Pastinaca Opoponax* (under which name it is figured in S. F. G. 288).

M. pimpinellæfolia (Pimpinella-leaved). *fl.*, petals slightly hairy outside. Involucre of one to three leaves; involucels of four or five leaves, dimidiate, deciduous. July and August. *fr.* orbicular. *l.* bipinnatifid, pubescent; segments cuneated, deeply serrated, lower ones reflexed, upper ones linear-lanceolate. Stem angular, branched. *h.* 2ft. Caucasus, &c., 1818.

MALABAR LEAF. A common name of *Cinnamomum Malabathrum*.

MALACHADENIA. Included under *Bulbophyllum*.

MALACHODENDRON. Included under **Stuartia** (which *see*).

MALACHRA (name used by Pliny to denote a Persian tree). ORD. *Malvaceæ*. A genus comprising five or six species of stove hispid herbs, all indigenous to the warmer parts of America, one or two being also broadly dispersed over the warmer parts of Asia and Africa. Flowers yellow, white, or rose, in dense, axillary or terminal heads, with leafy involucral bracts; calyx five-toothed or cut; column shorter than the stamens. Leaves angular or lobed. The species are of no great horticultural value. *M. fasciata* requires to be raised from seed, in a hothouse, and, when large enough, to be placed singly into small pots.

M. fasciata (fasciate). *fl.* rose; heads shortly pedunculate, three-leaved, about five-flowered. August and September. *l.* almost round, obsoletely lobed. Stems villous. *h.* 1ft. Caracas, 1819. (B. R. 467.)

MALACOCARPUS (from *malakos*, soft, and *karpos*, a fruit; alluding to the juicy fruits). ORD. *Cacteæ*. This genus, now included, by Bentham and Hooker, under **Echinocactus**, is composed of the smooth-fruited species of that genus (which *see* for culture).

FIG. 504. MALACOCARPUS ERINACEUS.

M. erinaceus (prickly). *fl.* straw-coloured, when in bud clothed with long silky brown hairs. Summer. Plant nearly bullet-shaped, very slightly depressed at top, with eighteen more or less spirally-curved ribs. Spines on young individuals, yellow; on older ones horn-like, brownish; eight or ten (seldom more) outer ones, and a single central erect one. Brazil. See Fig. 504, for which we are indebted to Herr Fr. Ad. Haage, jun., of Erfurt, Germany.

MALACOID. Having a mucilaginous texture.

MALAXIS (from *malaxis*, tenderness; in allusion to the nature of the species). ORD. *Orchideæ*. A monotypic genus. The species is a curious and interesting native Orchid, rarely seen in cultivation. It grows naturally in spongy bogs, and would probably thrive if naturalised in similar situations. Propagated by divisions of the roots.

M. paludosa (marsh-loving). *fl.* greenish-yellow, small; lip cordate at the base, embracing the column; sepals ovate or broadly lanceolate; raceme long, slender, terminal. July. *l.* from two to four, ovate, rough at the extremity. *h.* 3in. to 4in. Europe (Britain). (G. C. n. s., xxi. 144; Sy. En. B. 1489.)

MALAY OR ROSE APPLE. A name applied to the fruit of *Eugenia Jambos* and to some other species of *Eugenia*.

MALCOLMIA (named after William Malcolm, a London nurseryman, who published a Catalogue of Greenhouse Plants in 1771). ORD. *Cruciferæ*. A genus consisting of about twenty species of hardy, mostly annual herbs, many of which are very variable in habit, &c. They are found in the Mediterranean and Caspian regions, Persia, North Africa, and North-west India. Flowers white or purple. Leaves alternate, entire or pinnatifid. *M. maritima*, the well-known Virginian Stock, is of extremely easy culture in almost any soil or situation. Seeds should be sown, thinly, from early spring until the latter part of autumn. The other species require similar culture.

M. chia (Chian). *fl.* purplish-lilac, about half the size of those of *M. maritima*; racemes three to nine-flowered. June. *l.* pubescent beneath, entire or rarely toothed; lower ones obovate or spathulate; stem ones narrower and more acute. Stems much-branched, 6in. to 12in. high. Chio, 1732. (S. B. F. G. 40.)

M. littorea (seashore). *fl.* bright pink-purple, large, delicate; limb of petals not veined as in *M. maritima*. June to November. Pods hoary. *l.* lanceolate-linear, almost entire, hoary with short down. *h.* 6in. to 12in. Mediterranean region, &c., 1683. (B. M. 4672; S. B. F. G. i. 54.)

M. maritima (sea).* Virginian Stock. *fl.* lilac, rose, red, or white; pedicels bractless, disposed in racemes. Spring to autumn. *l.* elliptical, blunt, entire, narrowed at the base. Stems erect, branched. *h.* 6in. to 12in. Europe, &c., 1713. A very pretty annual, of which there are several varieties.

MALE FERN. *See* **Nephrodium Filix-mas.**

MALESHERBIEÆ. A tribe of *Passifloreæ*.

MALLOCOCCA. A synonym of **Grewia** (which *see*).

MALLOW. The common name for the species of **Malva** (which *see*).

MALLOW-WORTS. A name given by Lindley to the *Malvaceæ*.

FIG. 505. FLOWERING BRANCH OF MALOPE TRIFIDA GRANDIFLORA.

MALOPE (an old Greek name for a kind of Mallow mentioned by Pliny). ORD. *Malvaceæ*. A genus comprising only three species of very ornamental hardy annual glabrous or pilose herbs, confined to the Mediterranean region. Flowers violet or pink, pedunculate, showy. Leaves entire or trifid. These showy plants are of easy culture, in almost any ordinary garden soil, but they succeed best in a sandy one, and in a sunny situation. Propagated by seeds, sown either under glass, in March, or, in the open border, during the latter part of April or early in May.

M. grandiflora (large-flowered). A variety of *M. trifida*.

M. malacoides (Mallow-like). *fl.* rosy-pink, tinged with purple, large, axillary, solitary, pedunculate. June. *l.* petiolate, oblong-ovate, crenate or pinnatifid, cuneate or cordate at the base. *h.* 1ft. South Europe, &c., 1710.

Malope—*continued.*

M. trifida (three-cleft).* *fl.* purple or white, large; peduncles axillary, one-flowered. July to September. *l.* trifid, toothed, glabrous; lobes acuminated. *h.* 1ft. Southern Spain, 1808. The plant known in gardens as *M. grandiflora* is a variety of this species. See Fig. 505.

MALORTIEA (named in honour of E. von Malortie, of Hanover). ORD. *Palmæ*. A small genus (five species have been described) of elegant dwarf-growing stove Palms, natives of Central America. Flowers unisexual, in simply-branched spikes, springing from the axils of the lowermost leaves. Fruit small, roundish or egg-shaped. Leaves on long stalks, irregularly pinnate. Trunks slender. *M. gracilis* and *M. simplex* are admirable subjects for growing in a Wardian case. The species thrive best in a compost of peat and sand, to which a small quantity of sandy loam has been added. An abundance of water and perfect drainage are essential.

M. gracilis (slender). *l.* dark green, on very slender petioles, divided into segments which are toothed at the margins, and the lobes split in the centre. Stems slender, from 2ft. to 4ft. high. Guatemala, 1862. SYN. *Geonoma fenestrata*. (B. M. 5291.)

M. intermedia (intermediate). *l.* dark green, divided into two segments, or four—two unequal pairs; leafstalks slender, nearly as long as leaves. Stem slender, base of leaves forming a strong sheathing network of fine fibres. *h.* 2ft. Costa Rica.

M. simplex (simple). *l.* dark green, oblong, simple or bifid. Costa Rica, 1861. An elegant dwarf and slender-growing plant, somewhat resembling *M. gracilis*, but without the peculiar window-like holes in its leaves. (B. M. 5247.)

MALPIGHIA (named after Marcello Malpighi, 1628-1694, an Italian naturalist and Professor at Bologna). ORD. *Malpighiaceæ*. A genus containing about twenty species of stove evergreen small trees or shrubs, natives, principally, of tropical America. Flowers pink or white, axillary and terminal, fasciculate or corymbose, rarely solitary. Drupe fleshy. Leaves opposite, shortly petiolate, glabrous or tomentose, sometimes covered with stinging hairs, entire or spinose-toothed. The species thrive best in a compost of sandy peat and fibry loam. Propagated, during summer, by cuttings of nearly ripened young shoots, inserted with the leaves intact, under a bell glass, in bottom heat. All the species here described are South American.

M. angustifolia (narrow-leaved). *fl.* pale purple or pink; peduncles axillary, umbellate. July and August. *fr.* small, oval,

FIG. 506. FLOWERING BRANCHLET OF MALPIGHIA AQUIFOLIA.

Malpighia—*continued.*

furrowed, of a dark purple colour when ripe. *l.* linear-lanceolate, acute, beset on both surfaces with decumbent stinging bristles. Branches smooth. *h.* 7ft. 1737. Shrub. (L. B. C. 321.)

M. aquifolia (Holly-leaved). *fl.* pale blush or pink; peduncles axillary, solitary or twin, two-flowered. August. *l.* lanceolate, with spiny teeth, beset with decumbent stinging bristles beneath. Branches smooth. *h.* 7ft. 1759. Shrub. See Fig. 506.

M. coccifera (berry-bearing). *fl.* pale blush or pink; peduncles axillary, solitary, furnished with two small scales at their middle. June to August. *l.* obovate or roundish, with spiny teeth, smooth, shining. *h.* 2ft. 1733. A small bushy shrub, thickly beset with Box-like leaves.

M. glabra (glabrous). Barbados Cherry. *fl.* rose-coloured or bright purple; peduncles axillary, umbellate. March to September. *fr.* red, round and smooth, about the size and shape of a cherry, having one or more furrows on the outside, and containing a reddish pulp. *l.* ovate, quite entire, smooth, shining. *h.* 16ft. 1757. This tree is cultivated in all the West Indian Islands, and in many parts of the mainland of South America, for its fruits, which are esteemed there, but are much inferior to our cherries. (B. M. 813.)

M. nitida (shining). *fl.* pink; peduncles umbellately racemose, axillary and terminal. March to July. *l.* lanceolate, acute, quite entire, smooth, shining. *h.* 10ft. 1733. A beautiful shrub.

M. punicifolia (Pomegranate-leaved). *fl.* rose, on axillary, one-flowered peduncles. July. *fr.* about the size and shape of a cherry, very succulent, and of a pleasant, rather acid, taste. *l.* ovate, quite entire, smooth. *h.* 8ft. 1690. A shrub having the appearance of the Pomegranate.

M. urens (stinging). Cowhage, or Cow Itch Cherry. *fl.* pink or pale purple; peduncles one-flowered, aggregate, one-half shorter than the leaves; petals equal. June to October. *fr.* edible. *l.* oblong-ovate, clothed with decumbent bristles beneath, smooth above. Branches smooth. *h.* 3ft. to 6ft. 1737. Shrub.

MALPIGHIACEÆ. An order of often climbing trees or shrubs, principally inhabiting Brazil and Guiana. Flowers yellow or red, rarely white or blue; inflorescence indefinite, often terminal, racemose, corymbose or umbellate, or paniculate. Leaves generally opposite (petiole jointed to the stem), entire, flat (rarely alternate or whorled, sessile, sinuate-toothed or lobed, margins recurved); petiole or under surface or margin of the leaf often glandular; stipules usually geminate at the base of the petiole, rarely united into a sheath. There are about forty-nine genera and 600 species. Examples: *Banisteria*, *Bunchosia*, *Galphimia*, *Gaudichaudia*, and *Malpighia*.

MALUS. Included under **Pyrus** (which *see*).

MALVA (the old Latin name for a Mallow, used by Pliny and Virgil, altered from the Greek *Malachi*, a Mallow, which is probably derived from *malacho*, to soften; referring to its emollient qualities). Mallow. ORD. *Malvaceæ*. This genus comprises about sixteen species of mostly hardy, annual, biennial, or perennial, hirsute or glabrous herbs, indigenous to South Europe, temperate Asia, and Northern Africa. Flowers axillary, solitary or fasciculate, sessile or pedunculate, or rarely in terminal racemes; petals purplish-rose or white, never yellow, emarginate, very rarely denticulate. Leaves often angulate, lobed or dissected. Few of the species are worth growing, the plants being generally of a coarse and weedy growth. The exceptions are of easy culture in any moderately good garden soil. The perennial species may be increased by seeds, or by cuttings; and the annuals by seeds only.

M. Alcea (Alcea). *fl.* pale rosy-purple, about 2in. across, in terminal and axillary clusters. Summer. *l.* palmate, with incised divisions, light green, downy. *h.* 4ft. Europe, &c., 1797. Perennial. (B. M. 2197.)

M. A. fastigiata (fastigiate).* *fl.* red. July to October. *l.*, lower ones five-lobed, upper ones palmately five-cleft, with the lobes toothed. *h.* 2ft. to 3ft. Italy, 1820. Perennial. SYN. *M. Morenii* (B. M. 2793).

M. Creeana (Cree's). A synonym of *Malvastrum coccineum grossulariæfolium.*

M. crispa (curled). *fl.* white, pale purple at the tip, axillary, sessile or nearly so. June. *l.* angular, toothed, curled, glabrous. Stem erect. *h.* 2ft. to 6ft. 1573. Annual. Perhaps a native of China; it occurs in many countries in a naturalised state.

M. involucrata (involucrate). A synonym of *Callirhoe involucrata.*

Malva—*continued.*

M. lateritia (brick-coloured). A synonym of *Malvastrum lateritium.*

M. mauritiana (Mediterranean). *fl.* deep purple; pedicels axillary, numerous, one-flowered. June. *l.* five-lobed, obtuse. Stem erect. *h.* 4ft. to 6ft. South Europe, 1768. Annual. (S. F. G. 81.)

M. Morenii (Moreni's). A synonym of *M. Alcea fastigiata.*

M. moschata (musk).* Musk Mallow. *fl.* rose, about 2in. across, disposed in terminal and axillary clusters. Summer. *l.*, lower ones kidney-shaped, cut; upper ones with five deeply pinnatifid, jagged segments. *h.* 2ft. to 2½ft. Europe (Britain). A handsome perennial, of which there is a form with pure white flowers. (B. M. 2298.)

M. Munroana (Munro's). A synonym of *Malvastrum Munroanum.*

MALVACEÆ. An order of herbs, shrubs, or trees, with light and soft wood, dispersed through all the regions of the earth except the Arctic. Flowers variously coloured, commonly violet, purplish, pink, or yellow, often showy; peduncles axillary and one-flowered, or disposed in racemes, fascicles, or panicles; calyx with an involucel of whorled bracts; petals five, hypogynous. Leaves alternate, simple, usually palminerved, entire or palmilobed; hairs usually stellate. An emollient mucilage abounds in most of the species; some contain free acids, and are employed as refreshing drinks. There are about fifty-nine genera and 700 species. Well-known genera are: *Abutilon*, *Althæa*, *Bombax*, *Gossypium*, *Hibiscus*, *Lagunaria*, and *Malva*.

MALVASTRUM (name altered from *Malva*). ORD. *Malvaceæ*. This genus contains about sixty species of greenhouse or hardy herbs, natives, chiefly, of America. Flowers scarlet, golden, or yellow, shortly pedunculate or sub-sessile, disposed in axillary or terminal spikes. Leaves variable, entire, heart-shaped, or partite. In all probability, the species here described are the only ones now in cultivation. For culture, *see* **Malva.**

M. campanulatum (bell-shaped). *fl.* light purplish-rose, about ⅔in. in diameter, disposed in a long, loose, terminal spike. Late summer. *l.* large, deeply lobed; lobes twice sub-divided. Stem and leaves covered with short thin down. *h.* 1ft. to 1½ft. Chili, 1839. Greenhouse perennial.

M. coccineum (scarlet). *fl.* scarlet. July to September. *l.* very cæsious. Stem very short. *h.* 6in. Missouri, 1811. Hardy. SYN. *Cristaria coccinea* (under which name it is figured in B. M. 1673).

M. c. grossulariæfolium (Gooseberry-leaved). *fl.* red. July to October. *l.*, upper ones trilobate, central lobe elongated; lower less deeply lobed; petiole somewhat flattened above, hairy, like stem. Branches clothed with harsh stellate hairs. *h.* 2ft. United States, 1835. (B. M. 3698, under name of *Malva Creeana.*)

M. Gilliesii (Gillies'). *fl.* bright red, 1in. or more in diameter. Summer. *l.* palmatifid. *h.* 6in. Extra-tropical South America. SYN. *Modiola geranioides.*

M. lateritium (brick-coloured). *fl.* brick-red, handsome, on long peduncles. Autumn. *l.* three to five-lobed. *h.* 6in. South America, 1840. A prostrate, hirsute, hardy perennial. SYN. *Malva lateritia.*

M. Munroanum (Munro's). *fl.* reddish-pink, tinged with lightish-brown; pedicels one or two, from the upper leaves, in the axils, each bearing one or more flowers; calyx downy. June. *l.* alternate, distant, cordate, obtuse, three to seven-lobed; lobes again crenate-lobed, downy. Stems weak, requiring support. Columbia, 1828. Hardy. (B. M. 3537 and B. R. 1306, under name of *Malva Munroana.*)

MALVAVISCUS (from *Malva*, Mallow, and *viscus*, glue; referring to the mucilage with which it abounds). SYN. *Achania.* ORD. *Malvaceæ.* A genus comprising about six species of greenhouse evergreen shrubs or small trees, mostly hispid, natives of tropical America and Mexico. Flowers red, often pedunculate; petals erecto-connivent or spreading upwards; calyx five-fid. Leaves entire, toothed, or angularly lobed. The species thrive best in a compost of fibry peat and loam. Propagated by cuttings of side shoots, placed under a bell glass, in heat.

M. arboreus (tree-like). *fl.* scarlet, large; leaves of involuce erect. Summer. *l.* cordate, three to five-lobed, acuminated, roughish. *h.* 12ft. West Indies, 1714. Shrub. (B. M. 2305, under name of *Achania Malvaviscus.*)

Malvaviscus—*continued.*

M. mollis (soft). *fl.* scarlet; leaves of involucel rather spreading. Autumn. *l.* cordate, somewhat three-lobed, soft, tomentose. *h.* 12ft. Mexico, 1780. Shrub. (B. M. 2374, under name of *Achania mollis.*)

MAMESTRA. A genus of thick-bodied moths, belonging to the *Noctuæ*, or Night Moths, and including six species, which vary in breadth of wing from 1½in. to 1⅞in. All the moths are dark-coloured, with distinct lines or spots; and the larvæ are dull-coloured, usually some shade of green or brown. The larvæ feed on low plants, and in gardens are very hurtful to salad plants and potherbs. When full fed, they burrow in the ground, and form earthen cocoons, in which they become pupæ in autumn, to emerge as moths in the following spring. Though several species are injurious, the most hurtful in gardens is the Cabbage Moth (*M. Brassicæ*), which eats its way into the hearts of Cabbages, and can hardly be removed in any way short of cutting up the Cabbages. The same larva eats the leaves of Dahlias, Pelargoniums, and other garden flowers. *See also* **Cabbage Caterpillars.**

MAMILLARIA. *See* **Mammillaria.**

MAMMÆFORM. Formed like a nipple.

MAMMEA (from *Mammey*, its vernacular name in South America). ORD. *Guttiferæ.* A genus comprising five species of stove fruiting trees, of which one is tropical American, another tropical African, and the rest natives of tropical Asia and Madagascar. Flowers polygamous; calyx globular, opening in two valvate sepals; petals four to six; peduncles axillary, one-flowered, solitary or fasciculate. Drupe indehiscent, one to four-seeded. Leaves rigid, coriaceous, often having pellucid dots. The species require strong heat to thrive well; and a compost of fibry, sandy loam, with a little dried leaf mould, is most suitable. Propagated by cuttings of half-ripened shoots, taken with the leaves intact, and placed under a bell glass, in bottom heat.

M. africana. *See* **Ochrocarpus africanus.**

M. americana (American). Mammee-tree. *fl.* white, fragrant, 1½in. in diameter; peduncles one-flowered, short, scattered over the stouter branches. July. *fr.* large, round, obsoletely three or four-cornered, about the size of a cannon-ball, covered with a double rind; the outer leathery, one line in thickness, tough, brownish-yellow; the inner thin, yellow, adhering closely to the flesh, which is firm, bright yellow, has a singular, pleasant taste, and a sweet, aromatic smell; but the skin and seeds are very bitter and resinous. *l.* obovate, very blunt, quite entire, 5in. to 8in. long. *h.* 60ft. Tropical America, 1739. A handsome tree, with a thick, elegant, spreading head. Eau de Créole—an aromatic liqueur—is distilled from the flowers of this species.

MAMMEE-TREE. *See* **Mammea americana.**

MAMMILLARIA (from *mamilla*, a little teat, diminutive of *mamma*, the nipple; the plants are covered with mammæform tubercles, spirally disposed, the mammæ bearing radiating spines at the apex, and deciduous tomentum). Haworth, who founded the genus, wrote it *Mamillaria.* Including *Anhalonium.* ORD. *Cacteæ.* A genus comprising about 300 species of greenhouse succulent perennials, natives of Mexico, the warmer parts of North America, Brazil, and rarely occurring in the West Indies and Bolivia. Flowers produced towards the summit of the plants, usually in a transverse zone, solitary, and growing from the axil of one of the tubercles, or teats. Stem cylindrical or globular, seldom exceeding 10in. or 12in. in height, and usually only 3in. to 6in. high, and from 1in. to 3in. in diameter. The tubercles, or mamillæ, range in size from minute elevations scarcely ⅛in. high to 1in. high and as much in diameter, varying in form from cylindrical, spindle-shape, conical, or ovoid, to angular and irregularly pyramidal, spirally arranged around the stem, and spiny at the apex. Concerning this genus, Mr. Lewis Castle remarks, in his "Cactaceous Plants": "It would be very difficult to find any plants in the whole vegetable kingdom which present such beautiful examples of symmetry as the Mammillarias, and in their own family they are unique in this respect; for, though many of the grotesque Opuntias, Cereuses, and Echinocactuses, possess larger and more brilliant flowers, and they are surpassed in horticultural value by the Phyllocactuses and Epiphyllums, yet for delicacy of design they are unrivalled. A large number of them resemble exquisite pieces of mechanism, finished with the greatest minuteness and accuracy; others, again, might be imagined to have undergone a kind of crystallisation, their whole surface being frosted over with star-like spiculæ, arranged with geometrical precision; and still others appear as if covered with the finest gossamer. . . . . Strangely beautiful indeed are most of the Mammillarias, and in contrast with their neat rosettes or stars of spines, are the rosy, yellow, and white flowers, which are generally followed by small, berry-like, coral-coloured fruits, that, dotted amongst the spines, add another phase to the attractions of these plants. With so much to recommend them, it is not surprising that they have become great favourites with cultivators of Cacti, and with that portion of the public who have obtained any knowledge of them."

Mammillaria—*continued.*

FIG. 507. MAMMILLARIA (GRAFT ON CEREUS STOCK).

Cultivation. Mammillarias thrive in a mixture of sandy loam and finely-broken bricks and lime rubbish. Many of them affect limestone districts in a wild state, and to those which do not do so, the lime rubbish in the soil proves beneficial under artificial conditions. Plenty of light—indeed, full exposure to direct sun-light is desirable at all times—and careful watering are all that is needed to insure success. During the period of growth—spring and early summer—more heat is necessary than during the rest of the year. Some of the delicate species thrive admirably when grafted on some *Cereus* stock. See Fig. 507.

A representative list of the more select species is here given; the names quoted in Continental catalogues number four times more than those enumerated below.

M. angularis (angular-stemmed). *fl.* rosy-purple. Stem branched, 4in. to 8in. high, 2in. in diameter; tubercles conical, thick, ½in. long, with a tuft of white down at the top, and four or five white spines of irregular length. Mexico, 1835. A very distinct and robust-growing species.

M. applanata (flattened). *fl.* white, tinged with red. Stem simple, flattened; tubercles four-angled, pyramidal, white, woolly in axils when young. Spines straight; outer ones seventeen to twenty, very thin, white, pale yellow, or ashy-grey; central one upright, short. Mexico.

M. atrata (blackened). *fl.* reddish-pink, copiously produced near the apex of the stem. Stem simple, oval-cylindrical, thick; tubercles dark green, thick, conical, somewhat obtuse; the lower ones compressed, obtuse at apex; areolæ white-villous, setose. Chili (B. M. 3642.)

Mammillaria—*continued.*

M. bicolor (two-coloured).* *fl.* purple, small. Stem cylindrical, somewhat club-shaped, 8in. to 10in. high, 2in. to 3in. in diameter, branching from near the base; tubercles very short, dark green, hidden by the spines, which are in two series, the outer filiform, closely set, spreading, the others fewer, erect, yellowish. Mexico, &c., 1835. A distinct species, the whole surface of which appears as if covered with a fine cobweb.

M. Caput-Medusæ (Medusa's head). *fl.* white, about 1in. in diameter. Stem from 4in. to 6in. high, globular, or occasionally columnar; tubercles four-angled or ovate, bearing four small white spines and two thicker and stronger ones.

M. chlorantha (greenish-yellow-flowered). *fl.* greenish. Stem cylindrical, covered with long, densely interwoven spines. Texas, 1883.

M. cirrhifera (tendril-bearing). *fl.* bright rose; anthers yellow. Stem cylindrical, 3in. to 4in. high; tubercles short, conical, ¼in. long, glaucous-green, furnished with a crown of yellow spines. Mexico, 1835. A pretty little species, having a neat and symmetrical habit.

M. clava (club-shaped).* *fl.* two or three, large, handsome, showy, borne at the summit of the plant; base (calyx) of green scales, tipped with red; petals glossy straw-colour, numerous, serrated and mucronate at apex, the more exterior ones entire, and tinged with dull red; stamens orange, numerous; rays of the stigma yellow. June. Stem columnar, glaucous green, 1ft. high; tubercles pyramidal, large, projecting, and ascending; axils densely downy with white wool; areolæ terminal, and bearing besides eight to eleven long, rigid, pale brown spines, and a single larger and stronger one. Mexico, previous to 1848. (B. M. 4368.)

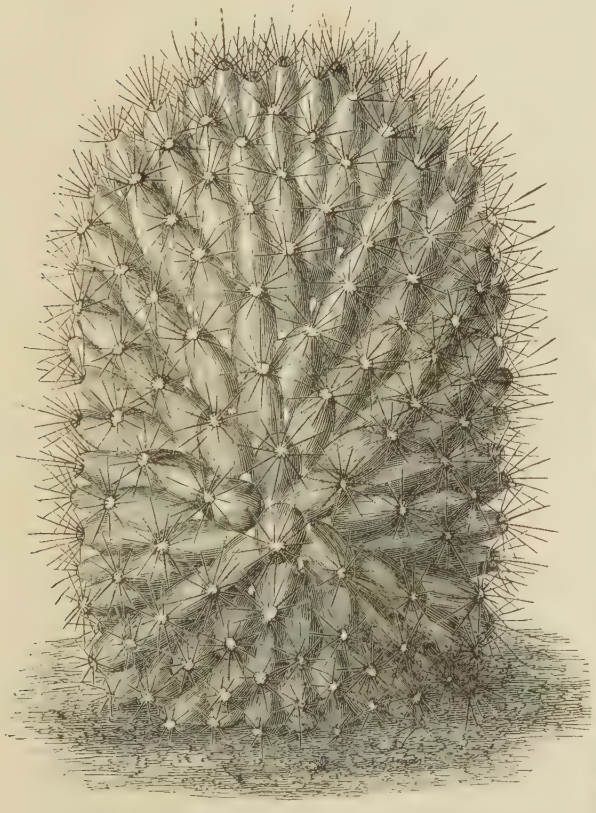


FIG. 508. MAMMILLARIA DOLICHOCENTRA.

M. dolichocentra (long-spurred).* *fl.* pale rose or reddish-crimson. Stem stout, 6in. to 8in. high, 3in. in diameter; tubercles conical, narrow, ½in. long, crowned with a small tuft of white down, and a few white spines of irregular length. Mexico. A strong-growing species, of variable habit. See Fig. 508.

M. floribunda (copious-flowering). *fl.* pink, tinged with red, very copiously produced; petals very unequal. Stem globose-sub-cylindrical; tubercles thick, conico-hemispherical, obtuse; prickles villose-tomentose. Chili. This species approaches *M. atrata*, but differs in its stouter habit, larger tubercles and flowers, and unequal petals. (B. M. 3647.)

Mammillaria—*continued.*

M. gracilis (slender).* *fl.* pale yellow, rather large. Stem cylindrical, 1in. to 2in. high, ½in. in diameter; tubercles small, green; spines in one series, white, spreading, closely set. Mexico. One of the prettiest of the dwarf-growing species.

FIG. 509. MAMMILLARIA HAAGEANA.

M. Haageana (Haage's). *fl.* bright carmine-rose, scarcely longer than the tubercles. May to July. Stem bullet-shaped when young, somewhat club-shaped when old, only slightly woolly in the axils; spines, outer ones about twenty, short, white; central ones two, stiff, longer, black. Mexico, 1835. See Fig. 509, for which we are indebted to Herr Fr. Ad. Haage, jun., of Erfurt.

M. Lehmanni (Lehmann's). *fl.* moderately large, terminal; petals straw-colour, numerous, linear-oblong, imbricated; filaments red. Stem 6in. high, oblong-cylindrical, covered all over with large conical tubercles, tipped with a minute woolly tuft, from which springs a fascicle of seven or eight slender spines, one of which is twice as long as the rest. Mexico, 1836. (B. M. 3634.)

M. micromeris (small-flowered). *fl.* pale rose, very minute, succeeded by red berries ⅓in. long. Stem resembling a flattened ball, 2in. in diameter, and 1½in. high, with a circular tuft of down in the centre at the apex, about 1in. across, surrounded by stiff white spines; tubercles very small, closely set. Mexico, &c.

M. multiceps (many-branched). *fl.* pale yellow, with a reddish line in the centre of the petals. Stem dwarf, much-branched or divided, 1in. high, ¼in. in diameter; tubercles ⅛in. to ¼in. long, fine, numerous, the inner yellow, larger, and stronger. Mexico.

M. Neumanniana (Neumann's). *fl.* of a rosy hue. Stem cylindrical, 5in. to 6in. high; tubercles stout, ⅝in. long, dark green, with a tuft of down at the apex, and a few tawny spines, ½in. long. Mexico, 1845. A bold and distinct species.

M. Odieriana (Odier's). *fl.* reddish-violet. Stem cylindrical, 3in. to 4in. high, 2in. in diameter, very symmetrical; tubercles ¼in. long, dark green, with the spines in two series, the outer close and fine, the inner tawny, ½in. to ¾in. long. Mexico. A very attractive and neat plant.

M. Parkinsonii (Parkinson's). *fl.* yellow. Stem 4in. to 6in. high, 2in. to 3in. in diameter; tubercles small, each bearing a star of diminutive white hairs, and four or five stiff erect white spines, 1in. to 1½in. long, tipped with brown. Mexico. A very distinct, stout-growing species.

M. Peacockii (Peacock's).* A small semi-globular mass, clothed with woolly hairs and spines, having much the appearance of a ball of grey worsted. Mexico, 1872.

M. pectinata (combed).* *fl.* yellow, about 2in. in diameter, lasting in beauty only about two hours. Stem conical or nearly globular, 3in. high, and 2½in. in diameter; tubercles short and stout, each crowned with a rosette, about ¼in. across, of white spines in one series. Limestone hills on the borders of Mexico. One of the handsomest species.

M. phymatothele (tumour-nippled). *fl.* bright rose. Stem 5in. to 6in. high, 2in. in diameter; tubercles ¼in. long, conical, dark green, crowned with a small tuft of white down, and a few white hair-like spines, which are spreading and erect. Mexico, 1846. A not uncommon and strong-growing species.

M. pulchra (handsome). *fl.* rosy, rather large, produced near the summit of the plant, from the woolly axils of the tubercles. June. Stem green, 4in. to 5in. high, oblong-cylindrical, with a depressed woolly apex, and almost covered with unequal spines, arranged in eleven to thirteen symmetrical, very spiral rows; tubercles rather large, ovately pyramidal. Mexico, 1826. (B. R. 1329.)

M. pusilla (small).* *fl.* yellowish, the petals with a central line of rose. Stem 1in. to 2in. high, cylindrical-globular; tubercles narrow, conical, ⅛in. to ¼in. long, grey-green; spines in two series, outer numerous, filiform, white; inner fewer, erect, brownish. West Indies, 1820. A very small, but exceedingly pretty plant. (L. B. C. 79, under name of *Cactus stellatus*.)

Mammillaria—*continued.*

M. p. texana (Texan). This principally differs from the type in the larger number of radial spines (there are from twelve to twenty in *M. pusilla*), and in the dark green colour of the tubercles; the exterior hair-like spines cover the whole plant as if with a coarse wool. Texas.

M. pycnacantha (densely-spined). *fl.* deep sulphur-yellow, five or six on the top of the plant, very handsome; petals linear-oblong; anthers orange. July. Stem 6in. high, of a rounded form, but nearly cylindrical; tubercles large, nearly 1in. broad at base, obscurely two-lobed; axillæ filled with dense white wool; spines twelve to sixteen, woolly at base, spreading and recurved, pale brown. Oaxaca, Mexico. (B. M. 3972.)

M. raphidacantha (needle-spined). *fl.* purplish-violet, about 1in. in diameter. Stem cylindrical, 3in. to 5in. high, 1in. in diameter, slender; tubercles short, conical, ¼in. long, dark green; spines eight or nine, in one series, spreading, star-like, close set, ¼in. long, white. Mexico. A very pretty species, the peculiar spines somewhat resembling crystals of ice.

M. recurva (recurved). *fl.* red, disposed in zones round the summit of the plant. Stem simple, sometimes divided; axils with abundant white wool; tubercles subtetragonous, compressed; spines few, very long, sub-angular, white, or nearly fawn-coloured. Mexico.

M. rhodantha (rose-flowered). *fl.* bright rose. Stem 2in. to 6in. long, 2in. in diameter, branched; tubercles conical, ¼in. to ½in. long, with a tuft of down at the apex, and six irregular white or yellowish spines ¼in. to ½in. long. Mexico, 1836. A most desirable, free-flowering species.

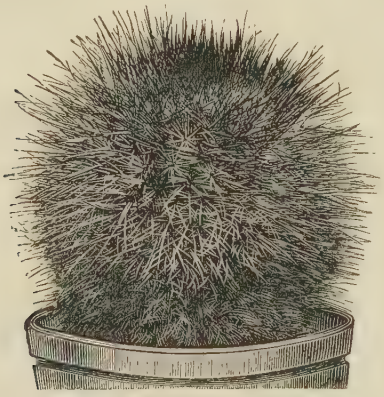


FIG. 510. MAMMILLARIA SANGUINEA.

M. sanguinea (bloody).* *fl.* dark red. Stem short, columnar; mamillæ glaucous-green, woolly in the axils, with from twenty-four to twenty-six radiating spines, and seven to nine stronger central ones, about twice as long as the outer spines. Mexico, 1883. See Fig. 510, for which we are indebted to Herr Fr. Ad. Haage, jun., of Erfurt. (R. G. 1111.)

M. Schiedeana (Schiede's). *fl.* white, small. Stem cylindrical, globular, 3in. to 5in. high, 2in. in diameter; tubercles dark green, cylindrical, ¼in. long, very narrow and distinct, with yellow, filiform spines, forming a small star ¼in. in diameter. Mexico, 1845. A very distinct and pretty species, producing flowers in abundance.

M. senilis (old). *fl.* orange-red, with a violet tint. Stem spheroid or cylindrical, bearing numerous long white spines. Mexico, 1874.

M. simplex (simple). *fl.* greenish-white, small. Stem simple, globular, 4in. to 6in. high; tubercles conical, small, crowned with white down and two series of strong reddish spines. Tropical America, 1690. The first species introduced.

M. stella-aurata (golden-star-spined).* *fl.* white, small. Stem 2in. high, ½in. in diameter, branched; tubercles short and green; spines in a flat, spreading, star-like rosette, very numerous, ¼in. to ½in. long, yellowish. Mexico. An exceedingly pretty species, being covered with star-like rosettes of yellow spines.

M. tenuis (slender). *fl.* pale straw-colour, slightly tinged with red externally, solitary, small, campanulate, produced from below the summit and from all sides of the plant. May. Stem 2in. to 4in. high, 1in. or more in diameter, cylindrical, or tapering upwards, and, as well as the copious globular side offsets, covered with green hemispherical tubercles; these are about ½in. in diameter, each tipped with a soft tuft of white down, from which diverges a cluster of about twenty slender aculei, at first reddish, then yellowish or pale tawny. Mexico, 1830. (B. M. 3646; B. R. 1523.)

M. tetracantha (four-spined). *fl.* bright full rose-colour, paler in the disk, numerous, small, from the axils of the tubercles, crowded about the depressed portion of the plant. July. Stem sub-globose, flattened at top, nearly 9in. high, and a little less in

Mammillaria—*continued.*

diameter; tubercles conical or pyramidal, terminated with a depression, from which arise four spreading prickles; the latter are about ⅜in. long, at first brown, tipped with a darker colour, then paler, becoming at length nearly white; axillæ between the tubercles occupied by a dense mass of white wool, as are also the apices of the tubercles. Mexico. (B. M. 4060.)

M. turbinata (top-shaped). *fl.* about 1in. in diameter, borne on the upper part of the plant; petals pale yellow or straw colour; anthers and stigmas yellow. June. Stem globose, depressed at the summit, and contracted at base, as large as a moderate-sized apple; tubercles at the contraction of the stem flattened, and lengthened out transversely; the rest are prominent, sub-hemispherical, but obtusely quadrangular and umbilicated at top, whence, in the upper ones, rises a fascicle of from three to five spines; the other tubercles are spineless, the spines being deciduous. Mexico, 1838. (B. M. 3984.)

M. Wildiana (Wilde's).* *fl.* rose. Stem 3in. to 4in. high, cylindrical, closely surrounded by offsets; tubercles conical, dull green; spines in two series, the outer white, closely spreading; the others fewer and large, yellowish, and hooked at the apex. Mexico. A desirable species.

MAMMOTH-TREE. *See* **Sequoia gigantea.**

MANCHINEEL-TREE. *See* **Hippomane Mancinella.**

MANCINELLA. A synonym of **Hippomane** (which *see*).

MANDARIN ORANGE. *See* **Citrus nobilis.**

MANDEVILLA (named after H. J. Mandeville, a British Minister at Buenos Ayres). SYN. *Amblyanthera.* ORD. *Apocynaceæ.* A genus comprising about forty-five species of tall climbing shrubs, natives, for the most part, of tropical America. Flowers yellow, white, or rarely violet, often large, in simple racemes; calyx five-parted; corolla funnel-shaped; tube cylindrical or ovoid; throat campanulate or oblong, without scales. Leaves opposite, feather-veined. *M. suaveolens*, the only species yet introduced, is a very handsome, half-hardy, deciduous climber, thriving in a compost of good peat and turfy loam, in equal parts, to which may be added plenty of silver sand. It forms an excellent subject for planting in a conservatory and training up a rafter, or may be successfully cultivated, in some parts of England, in the open air, if provided with protection in winter. Propagated by cuttings, made of small, stiff, side shoots, about 3in. long, and inserted in sand, under a bell glass. This plant rarely succeeds when grown in pots.

M. suaveolens (sweet-scented). *fl.* pure white, large, very fragrant, sometimei borne in great profusion. Summer. *l.* opposite, cordate oblong, dark green. Buenos Ayres, 1837. (B. M. 3797; B. R. xxvi. 7.)

MANDIOCCA. A synonym of **Manihot** (which *see*).

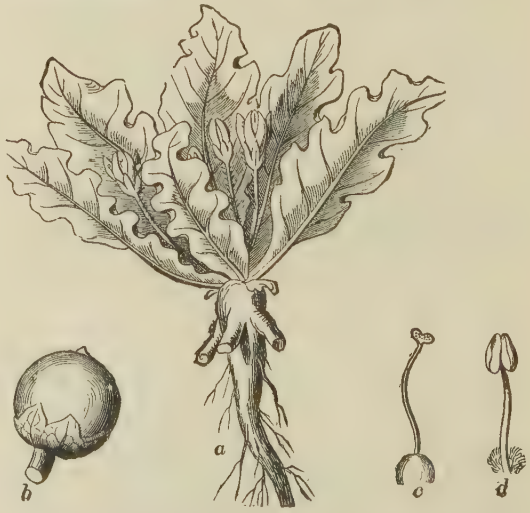


FIG. 511. MANDRAGORA VERNALIS showing (*a*) Entire Plant in Flower; (*b*) Young Fruit; (*c*) Ovary, &c.; (*d*) Stamen.

MANDRAGORA (the old Greek name used by Hippocrates). Mandrake. ORD. *Solanaceæ*. A genus comprising three or four species of hardy perennial, almost stemless, herbs, with large thick roots, inhabiting the Mediterranean region. Flowers pale bluish-violet, whitish or purplish, large, reticulately veined; corolla campanulate, somewhat five-cleft; lobes rather broad, flat, imbricated. Berry globose. Primordial leaves of the stem abbreviated, sub-radical, petiolate, large, undulated or sinuate-toothed; older ones often narrower and entire. The species are chiefly of botanical interest, and scarcely merit a place in the garden. They thrive in a deep, light soil, and in a shady situation. Propagated by seeds, or by divisions of the root.

M. autumnalis (autumnal). *fl.* violet-coloured, on pale purple scapes; corolla spreading. September. *l.* oblong, pilose, wrinkled, undulated, bristly on the upper surface. *h.* 6in. to 12in. South Europe, 1548. Supposed to be the Mandrake mentioned in the 30th chapter of Genesis. (S. B. F. G. ser. ii. 325.)

M. officinalis (officinal). A synonym of *M. vernalis*.

M. vernalis (spring).* Devil's Apples. *fl.* white or bluish. May. *l.* oblong-lanceolate and ovate, acute, 1ft. long, undulated. *h.* 1ft. South Europe, 1548. See Fig. 511.

MANDRAKE. *See* **Mandragora.**

MANETTIA (named after Xavier Manetti, Prefect of the Botanic Gardens at Florence in the middle of the eighteenth century). SYNS. *Bellardia, Conotrichia, Guagnebina, Lygistum,* and *Nacibea*. ORD. *Rubiaceæ*. A genus of thirty species of very ornamental, stove, evergreen, herbaceous or suffrutícose climbers, natives of tropical America and sub-tropical Australia, allied to *Bouvardia*. Flowers white, blue, or red, on axillary peduncles; corolla funnel-shaped, with a terete tube and a hairy throat; peduncles one or many-flowered. Leaves ovate-oblong, or sub-cordate; stipules broad, short, acute. The species are of easy culture in a compost of peat, loam, and sand, in equal parts. Many are exceedingly useful for growing on a trellis, a rafter, or pillar, pruning occasionally where very strong growth is made. Propagation is effected by cuttings, made of the young shoots, and inserted in a sandy soil, in bottom heat.

M. bicolor (two-coloured). *fl.* bright scarlet at the lower portion, yellow towards the apical part of the tube, solitary and axillary. March. *l.* lanceolate, tapering to a point, bright green, opposite. Organ Mountains, 1843. (F. d. S. 61.)

M. coccinea (scarlet). *fl.* having a white tube spotted with red, a throat closed by yellow hairs, and four oval-acute lobes, which are scarlet and villous above; peduncles axillary, racemose, few-flowered. May and June. *l.* ovate, acuminated, glabrous, shining. Branches tetragonal. French Guiana, 1806. (B. R. 693.)

M. cordifolia (cordate-leaved). *fl.* scarlet, 1in. long, villous inside; peduncles axillary, one-flowered. August to October. *l.* ovate, cordate at the base, acute at the apex, pubescent. Brazil, 1832. A very useful species, flowering from winter until early summer. (B. M. 3202.)

M. micans (glittering). *fl.* rich orange, with yellowish lobes; panicles leafy, many-flowered. Early winter. *l.* ovate-lanceolate, cordate at the base, bright shining green, on very short petioles. Magna, Peru, 1865. A very handsome, strong-growing species, and one of the best in cultivation. (B. M. 5495.)

MANGEL WURZEL (*Beta vulgaris macrorhiza*). A cultivated race of *Beta vulgaris*, largely grown as fodder for cattle.

MANGIFERA (from *Mango*, the Hindoo name of the fruit, and *fero*, to bear). ORD. *Anacardiaceæ*. A genus containing less than fourteen species of stove evergreen trees, natives of tropical Asia. Flowers pedicellate, in branched terminal panicles; calyx four or five-partite; petals four or five, spreading, imbricated. Fruit sub-reniform or ovoid, fleshy. Leaves alternate, petiolate, simple, entire, coriaceous. The Mango-tree, *M. indica*, is sometimes seen in this country, and its fruit has been occasionally grown to perfection. It thrives best in a compost of peat and rich loam. Propagated by cuttings of nearly ripened shoots, inserted in sand, under a glass, and in bottom heat.

M. indica (Indian). Mango-tree. *fl.* whitish, streaked with yellow, disposed in loose terminal bunches or panicles. July.

Mangifera—*continued.*

fr. somewhat kidney-shaped, yellowish and reddish, or speckled with black when fully ripe, and replete with a fine agreeable juice. *l.* oblong-lanceolate, stalked, 7in. to 8in. long, and 2in. or more broad. *h.* 60ft. East Indies, 1690. (B. M. 4510.)

MANGLESIA. Included under **Grevillea** (which *see*).

MANGLILLA. A synonym of **Myrsine** (which *see*).

MANGOSTANA. A synonym of **Garcinia** (which *see*).

MANGOSTEEN. *See* **Garcinia Mangostana.**

MANGO-TREE. *See* **Mangifera indica.**

MANGROVE. *See* **Rhizophora.**

MANICARIA (from *manica*, a glove; referring to the spathe which surrounds the flower stem). SYN. *Pilophora*. ORD. *Palmæ*. This genus comprises two or three species of robust, unarmed, stove Palms, natives of tropical America, from Northern Brazil to New Grenada. Flowers yellowish-pink, rather large, sweetly scented; spadix interfoliaceous. Leaves terminal, large, rigid, sub-erect, lanceolate, acute, plicate-nerved, serrate, at length pinnatisect. *M. saccifera*, probably the only species yet introduced, inhabits the tidal swamps of the Lower Amazon River, and is distinguished from nearly all other Palms in the leaves being entire, or occasionally irregularly split when old. A rich sandy loam is necessary for its culture. Propagated by seeds, which should be sown in a strong, moist heat.

M. saccifera (bag-bearing). *fl.* of separate sexes borne upon the same spike; spikes simply branched, from 3ft. to 4ft. long, hanging down among the leaves, and inclosed in an entire brown spathe of a tough fibrous texture, which is at length split open. *fr.* three-lobed, covered with blunt angular tubercles of a dry, corky nature. *l.* simple, sometimes 30ft. long, and 4ft. to 5ft. wide, with coarsely serrated edges, and transverse furrows, stiff, erect upon the summit of the stem. Trunk erect, deeply ringed, from 15ft. to 20ft. in height. South America, 1823.

MANIHOT (the Brazilian name of the genus). SYNS. *Janipha, Mandiocca*. ORD. *Euphorbiaceæ*. A genus comprising about eighty species of mostly greenhouse tall herbs or evergreen shrubs, all natives of America, and, for the most part, Brazilian; a few being dispersed through the warm regions as far as Mexico. Flowers usually rather large, racemose, monœcious, apetalous; racemes terminal, or in the axils of the upper leaves, simple, or slightly branched. Leaves alternate, petiolate, undivided, or often digitately three to seven-lobed or parted; segments petiolate or variously confluent, membranaceous or coriaceous, feather-veined, entire or sinuately lobed. Some of the species of this genus are of great economic value. From *M. Aipi* and *M. utilissima*, Cassava, or Mandiocca meal, is obtained. The root of the former plant is sweet and wholesome, and is utilised as a vegetable in its native country; but that of *M. utilissima* is virulently poisonous and bitter. The poisonous juice is, however, expressed in the process of manufacture, and, when allowed to settle, deposits what is known as Brazilian Arrowroot, or Tapioca. From this the Tapioca of our shops is prepared. The species are of little horticultural value. They thrive best in a compost of peat, loam, and sand, to which may be added a small quantity of charcoal. Propagated by cuttings of young, rather firm shoots, inserted in sandy peat, under a bell glass, in bottom heat.

M. Aipi (Aipi). Sweet Cassava. This differs from *M. utilissima* in having wholesome, sweet, reddish roots.

M. utilissima (most useful). *fl.* yellowish; calyx five-lobed or parted. July. *l.* seven to five (or three) parted, glaucous beneath; segments oblong-lanceolate or lanceolate, acuminate, quite entire. Stems rising from long, thick, fleshy, cylindrical roots, erect, knotty, somewhat twisted. *h.* 3ft. South America, 1739. (B. M. 3071, under name of *Janipha Manihot*.)

MANNA ASH. *See* **Fraxinus Ornus.**

MANNA-TREE. *See* **Alhagi.**

MAN ORCHIS. This is a name usually assigned in books to *Aceras anthropophora*, which is also called Green Man, or Green Man Orchis.

MANTISIA (from *mantis*, an insect, to which the flowers have been compared). ORD. *Scitamineæ*. A small genus (two species) of stove herbaceous perennials, natives of the East Indies. Flowers pale violet, with a yellow lip; thyrse loose; scape leafless. Leaves usually narrow, with a long twisted point. *M. saltatoria* is the species usually seen in our stoves. It thrives in a compost of sandy peat and fibry loam; thorough drainage is most essential. Propagated by divisions, made just as growth commences.

M. saltatoria (dancing).* Dancing or Opera Girls. *fl.*, petal yellow, large, the rest of the flower purple; laciniæ dissimilar, the upper one rounded in a kind of blunt spur, two lower somewhat ear-shaped; bracts large, petal-like. July. *l.* broad-lanceolate, much elongated at the point, with petioles entirely sheathing the stem. *h.* 1ft. East Indies, 1808. (B. M. 1320.)

MANULEA (from *manus*, the hand; in allusion to the divisions of the corolla). SYN. *Nemia*. ORD. *Scrophularineæ*. A genus comprising about twenty-five species of glabrous or pubescent greenhouse herbs, or rarely sub-shrubs, confined to South Africa. Flowers racemose; racemes sometimes simple and naked, or minutely bracteate, sometimes compound, composed of many-flowered peduncles; corolla-tube elongated, somewhat erect at top. Leaves often at the base of the stem, approximate or rosulate; stem ones few, opposite, or upper alternate; floral ones small, often bract-like. For culture, *see* **Celsia.**

M. rubra (red).* *fl.* golden-yellow, ½in. long; raceme interrupted, a little branched. April to September. *l.* oblong-lanceolate, dentate, narrowed at the base, downy. Stem erect, decumbent at the base, villous. *h.* 1ft. to 2ft. 1790. Perennial.

M. tomentosa (tomentose). *fl.* orange; raceme many-flowered, 2in. to 3in. long. May to November. *l.* obovate or oblong, toothed, thick, densely tomentose. Stem decumbent, dwarf, branched, villous. *h.* 1ft. 1744. Perennial. (B. M. 322.)

MANURES. The use of Manures is to supply nutritive matter for encouraging and sustaining plant growth; any substance, therefore, added to the soil which has the power, either directly or indirectly, of increasing its fertility, may be considered as a Manure. It may contribute directly, by supplying what is requisite, or indirectly, by its action on other substances that might be already present, but not in a suitable state for being absorbed. Growth in plants cannot take place without the main constituent parts of which they are composed being extracted from the earth; and as the production of crops annually necessitates the withdrawal of an enormous supply of certain elements from the soil, it is evident that, were they not restored by some means, exhaustion would, sooner or later, take place. Manures contain, in a concentrated form, the elements requisite for the sustenance of plants, some being much stronger than others, according to the proportion of powerful constituents, combined either in a natural or an artificial manner, in their preparation. The strength of Manures, and their special adaptability for certain crops, must always be a guide to the gardener in disposing of them to the best advantage. In their application to plants at an improper time, or in an improper way, direct harm, or possibly death, may be caused, while the same application, at a suitable season, might be attended with beneficial results. According to experiments which have been made, "all substances entering into the composition of vegetable Manure, or food, must be in a state of fluidity, or in the form of gas or air. The great object, therefore, in the application of Manure, should be to make it afford as much soluble matter as possible to the roots of the plant, and that in a slow and gradual manner, so that it may be entirely consumed in forming its soft and organised parts." Substances of animal or vegetable origin must, therefore, undergo a process of decomposition before they can become absorbed for the nourishment of plants. This may partly take place before they are applied to the soil, or, in some cases, it may be entirely effected afterwards. It is not intended here to describe the nature of different changes which take place chemically, in consequence of the exposure of various substances to the air, or from their being placed in contact with each other. Changes must and do take place naturally; for practical purposes, it matters not so much how they are caused, as how far they succeed in accomplishing their intended purpose in promoting fertility in the soil to which they are applied. All Manures may be, and usually are, divided into two classes. Those composed of vegetable or animal substances of any description are termed *Organic*; and others, which are of mineral origin, are termed *Inorganic*.

Manures—*continued.*

A few of the different kinds most in use are briefly enumerated below. An excellent plan of applying strong Manures is to mix a proportion with, in many cases, several times its bulk of soil or garden refuse, and so form a fertilising compost, which may be applied to almost any garden crop with excellent results. Composts thus prepared become useful in two ways: the powerful properties of the Manure, when intermixed with soil, become partially absorbed by the latter, and are rendered less harmful; and the decomposition of all the vegetable matter is also at the same time hastened.

I. Organic Manures.

Blood. This is extremely powerful as a Manure. It is rich in nitrogen; but the chemical composition varies somewhat, according to the different animals from which it is obtained. Blood is most safely applied to land after being dried, or when mixed with earthy substances to form a compost.

Bones. Both for field and garden crops, as well as for fruit and other trees, grown in pots or in borders, bones are extensively employed as Manure. When used in merely a crushed state, their decomposition is usually slow, consequently, the fertilising properties are lasting. If reduced to a powder, and applied, the results are observable in a much shorter time. Bones may be dissolved by throwing them into a compact heap, moistening, and then covering them with earth. In this condition, they soon ferment and crumble, and when thus reduced they may be applied to the land. Crushed bones may be advantageously used with nearly an equal amount of ashes, or with one-third their weight of gypsum. Bone Manure is specially beneficial to crops of Turnips.

Farmyard Manure. By this term reference is made to Manure collected from various sources on a farm. The excrements of different animals possess special fertilising properties, and may be kept separate for particular purposes. For ordinary uses, Farmyard Manures are best mixed together, as then a larger number of different constituents are included in the whole, and are consequently available as plant food. The liquid, as well as the solid, portions, should be retained for affording moisture, to cause a slight fermentation, and also for its own enriching properties. Violent heating by fermentation should not be allowed, but partial decomposition of such Manure before adding it to the soil will render the parts more soluble, and in a better state for being readily absorbed. The value of good Farmyard Manure to all crops, and the method of applying it to land is so well known, that no further reference is necessary.

Fish. Fish are sometimes used as Manure. Their decomposition is very rapid, and the quantity applied to land must be limited, on account of its strength. Fish are more safely used as Manure if mixed in a compost of soil and refuse, so that the powerful fertilising properties may be evenly distributed throughout.

Manures—*continued.*

Garden Refuse. Such refuse as Cabbage leaves, Turnip tops, and green vegetable matter of almost any description, is valuable as Manure, if dug in when green. If left to decompose first on the surface, many important gases will escape into the air.

Guano. This valuable and well-known Manure, obtained principally from islands off the coast of Peru, and various other places on the coast of South America, is the excrement of sea-birds. It has been deposited there during the course of centuries, and, since being discovered, its exportation has been so extensively practised as to cause uneasiness lest the supply should become exhausted. The quality of Guano obtained from different places varies considerably; that which is supposed to be the best comes from the Chincha Islands, where the supply has, in consequence, been greatly diminished. The chief fertilising properties of Guano having been ascertained by analysis, various artificial manures are now prepared as substitutes, which are very similar in many respects. Pure Guano is far too caustic for use by itself. It should be mixed with about six times its bulk of loamy or charred soil. Thus prepared, it may be used at the rate of about 4cwt. per acre, or, in a small way, as a top-dressing, by spreading thinly and evenly over the surface. For the purpose of watering plants, the proportion of Guano that may be mixed with water varies according to the sort of plant for which it is required. About 1oz. to two gallons of water may generally be used with safety; some plants will, however, bear a stronger solution.

Horn Shavings, &c. The refuse obtained from the parings of horses' feet at the shoeing forge, and also all the shavings &c., made in the manufacture of various articles from horns, are most valuable as Manures. Horn Shavings are readily mixed in any compost, and are most beneficially employed in those prepared for fruit trees, or for any plants which have to be grown in pots. If the particles are not very small, they last a long time without becoming wholly decomposed.

Leaves. These are invaluable as Manure when reduced to a state of mould by a process of gradual decay. They are most beneficially applied to heavy soils and to plants whose roots require somewhat more than ordinary encouragement. Mixed with stable litter, they tend to prevent violent fermentation, and retain, instead, a moderate amount of heat for a much longer period. *See also* **Leaf Mould.**

Liquid Manure. Manure of almost any description is quicker in its action, and may be employed most effectually, in a liquid state. It has, also, the advantage that it may be applied at any season when nourishment is required, either by growing crops or plants in pots. Urine is generally too powerful for use by itself as a liquid manure; diluted with water, to the extent of two or three parts of the latter to one of the former, it may usually be safely applied. Water collected from a heap of farmyard Manure, exposed to rain, contains in solution many most important fertilising properties, and is, consequently, very valuable. Cow-dung is readily obtained, and forms one of the best and least harmful of substances for preparing Liquid Manure to be applied to crops or plants of any description. It possesses none of the caustic principles so prevalent in chemical preparations, or, at least, not a sufficient quantity to cause injury when properly used with plants requiring a stimulant. It should be thrown in a large tub, and stirred occasionally, to render the water which is added a dark brown colour. The excrement of sheep, deer, fowls, pigeons, &c., are all of a more concentrated and powerful nature than cow-dung; consequently, they must only be used in more limited quantities. Soot is one of the best substances for Liquid Manure, as it always tends to produce a fine dark colour and healthy foliage. It should be placed in a bag, and left soaking in a tub of water, which may be used most effectually in a clear state. Liquid Manure is frequently made by adding a small portion of some highly concentrated preparation to a can of water, and applying it at once to the plants it is intended to stimulate. This is a ready and a clean method of preparing it, but one which requires some caution in guarding against the dose being too strong. Guano, as previously stated, may be used at the rate of 1oz. to two gallons of water; with many plants a stronger solution will do no harm; but this knowledge must be gained by experience. Sulphate of ammonia may be used in a similar proportion. All chemical Manures intended for use when dissolved in water, should be tried first in a weak solution, and the strength increased gradually if results warrant it. Liquid Manures, being ready for immediate absorption by plants, are most effectually employed when the latter are in an active state, and in want of a stimulant for assisting the development of their crops, or for sustaining their growth. A tank for collecting the drainings from dunghills, or for the special preparation of Liquid Manure, is very useful in or near a kitchen garden, as a supply may always be kept in readiness for use, and the possibility of waste can also be prevented. A slate tank being practically indestructible, is much better than a tub, but one is not always procurable. It might be 6ft. deep, partially sunk into the ground, and provided with a wooden covering, to prevent leaves falling in, and also to preclude the contents from being exposed to view. A perforated partition is sometimes provided, the solid portions of the Manure being kept on one side, and any of the liquid dipped from the other as it is required. A water supply, either in connection with, or in close proximity to, Liquid Manure tanks, is very important where a large quantity is used.

Manures—*continued.*

Malt Dust. This forms a very good Manure, and those who have used it speak highly of its qualities. It must be kept as dry as possible, and used in a fresh state. Being quick in action, it proves valuable as a top-dressing to fruit and other trees; but its effects are not of a permanent character when otherwise applied.

Night-soil. An extremely powerful Manure, and one which is rich in nitrogen. Its proper application to crops is generally attended with good results, but Night-soil is not used nearly so much as it might be, partly on account of its offensive odour. This may be effectually taken away by mixing with a deodorizer, such as dry earth, sifted ashes, or, better still, charcoal, or charred peat. Quicklime is frequently recommended, and answers for the purpose; but it, at the same time, dispels a large proportion of ammonia, which is a great loss to the manurial properties. Night-soil should be prepared in a compost for applying to garden crops; mixed with dry earth or charcoal-dust, it may be used lightly as a top-dressing for fruit-trees, especially vines, and for many vigorous-growing trees or plants.

Sea Weeds. In a fresh state, these are frequently used as Manure near the coast, either for digging in the ground or for a top-dressing. The effect on crops is not a lasting one. When burnt, Sea Weeds yield a large proportion of ash, which is peculiarly rich in soda, and consequently valuable as a Manure.

Soot. The fertilising properties of Soot are very valuable. It has an advantage over many other Manures, as it can hardly be misapplied. It should be kept dry until required for use. As a Manure for land, it may be applied at the rate of twenty bushels, or more, to an acre. Soot may be sown with advantage along the drills intended for Turnip, Onion, Carrot, and similar seeds, as, apart from its manurial properties, it

Manures—*continued.*

materially assists to keep down the larvæ of destructive insects.

Woollen Rags or Refuse. In some places, these are used with great success as a fertiliser for Potatoes and all green crops; but, as they are slow in decomposing, the effect produced is extended over a considerable period. The Rags should be chopped up in small pieces, and buried in the soil.

II. Inorganic Manures.

Ammonia. One of the chief component parts of Manures, and one which has a powerful stimulating action on the growth of plants. It is formed by the decay of organic matter in the soil, and also in the air; and, being very soluble in water, is rapidly brought to a suitable state for assisting vegetation, by a plentiful supply of nitrogen. Ammonia may be supplied to plants by the application of organic Manures capable of forming it, or by the use of ammoniacal salts. These latter must be cautiously employed, as they are extremely powerful, and their effects are almost immediate. As a dressing for land, they may be applied at the rate of about 2½cwt. per acre, in moist weather, or just before rain, which will quickly carry them into the earth.

Ashes. Wood Ashes, and any small pieces of Charcoal that may be left as the remains of a fire, form excellent Manures, suitable for applying by themselves, or intermixing with others which are of a stronger nature. Wood ashes, being usually rich in potash, are specially valuable to plants requiring this element; but they will not supply the want of organic Manure. Charcoal has the important property of absorbing ammonia and other gases, and again giving them off for the nourishment of plants On this account, it is valuable as a deodorizer. Coal Ashes are valuable as manure in some cases, although inferior to the ashes obtained from wood and vegetables. If they contain many cinders, from not having been thoroughly burned, they are more suited to heavy than to light soils, as they tend to mechanical division, which, though beneficial to the former, may be injurious to the latter. Peat Ashes are also of great benefit. The peat must be thrown out, dried, and then burnt until it becomes charred through, and reduced to cinders. These latter form a valuable dressing for the soil.

Gypsum, or Sulphate of Lime, has been applied with success to crops of Turnips, Potatoes, &c., in quantities of one bushel on sandy, to five or six bushels on clay soil. It acts most beneficially on soils which are naturally dry, or have been made so by artificial drainage. It is not much employed as a Manure in this country.

Lime is a valuable Manure for some soils and plants; but to others its application proves very injurious. *See* **Lime.**

Liquor of Ammonia, at the rate of 1oz. to 4 gallons of water, has also a beneficial effect; but, as the strength varies, it should not be applied in larger quantities.

Marls. These are composed of carbonate of lime, mixed with clay, sand, or loam, and frequently with sulphate and phosphate of lime. They are adapted to the improvement of soils which are not already sufficiently charged with lime. Marl is improved by exposure to the sun, and especially to the frosts of winter, before spreading it on the land.

Nitrate of Soda. A powerful Manure, used to a considerable extent, and deemed especially beneficial to grain crops; it is found in large quantities, in beds, and as an incrustation on the soil in some parts of South America. It is imported into this country as a chemical Manure, and also for manufacturing purposes. Its effects are rapid, and very similar to those produced by ammonia.

Manures—*continued.*

Salt. On some soils no apparent benefit is derived from the use of Salt. Such lands as are near the seacoast, and occasionally receive deposits from the salt spray, which is often carried far inland by storms; or such as contain chlorine and soda in any other form, and in sufficient abundance for meeting the requirements of crops, are not affected by it. But in other situations, when used at the rate of five to ten bushels per acre, very material results have followed. Its great affinity for water has the effect of attracting dews and atmospheric vapour to the growing vegetation. Salt is also useful for destroying slugs, worms, and larvæ.

MAPLE. The common name for **Acer campestre** (which *see*).

MAPPA. Included under **Macaranga** (which *see*).

MARAJA PALM. *See* **Bactris Maraja.**

MARANTA (named after Barthol. Maranti, a Venetian botanist, who died in 1754). Arrow-root. ORD. *Scitamineæ.* A genus comprising about ten species (with numerous varieties) of stove herbaceous perennials, with tuberous or creeping rhizomes. They are natives of tropical America, but are cultivated in the East and West Indies, Sierra Leone, &c. Inflorescence terminal, loosely dichotomous; branchlets few-flowered; pedicels short, one-flowered, often twin, ebracteolate. Leaves sheathed, with or without petioles. Stems sometimes short, few-leaved; sometimes tall, branched, occasionally rather woody at base. The Arrowroot of commerce is extracted from the tubers of several species of this genus. A number of species formerly included under *Maranta* are now removed to *Calathea.* Marantas thrive in a compost of two-thirds good turfy loam and one-third leaf mould and sand, and like abundance of water, heat, and atmospheric moisture when growing. As soon as growth is furnished, the plants should be kept rather dry until the following spring, when they must be shaken out and repotted. The general remarks under **Calathea** (which *see*) apply equally well to Marantas.

M. albo-lineata (white-lined). A synonym of *Calathea ornata albo-lineata.*

M. angustifolia (narrow-leaved). *fl.* pale bluish, in a lax, zigzag panicle. July. *l.* smaller than those of *M. arundinacea,* and narrowed at the base. Trinidad. A smaller plant than *M. arundinacea.* (B. M. 2398.)

M. arundinacea (reed-like). Indian Arrowroot. *fl.* white, very fugitive. July and August. *l.* ovate-lanceolate, rather pilose below. Culm branched. *h.* 6ft. to 10ft. Tropical America, before 1732. (B. M. 2307.)

M. bicolor (two-coloured).* *l.* orbicular, ground colour pale glaucous-green, with irregular-shaped blotches of polished dark olive midway between the midrib and margin; under surface rosy-purple. *h.* 1ft. Brazil, 1823. An old but pretty spreading species. (B. R. 786; L. B. C. 921.)

M. chimboracensis (Chimborazo). *l.* 6in. to 12in. or more in length, ground colour light green, having a zigzag zone of olive-green traversing the entire length, a little distance from the midrib, the outer edge of the zone bordered with white. Ecuador, 1869. An elegant species, with a dwarf and distinct habit. SYN. *Calathea chimboracensis.*

M. concinna (neat).* *fl.* yellow, on short radical scapes. *l.* obliquely ovate, pale bright green, the base of the principal veins marked by an oblong blotch of deep green. South America, 1874. A neat, dwarf, tufted perennial.

M. coriifolia (Coris-leaved). A synonym of *Calathea ornata regalis.*

M. depressa (depressed). *l.* pale green in the centre, with brown blotches. Brazil, 1880.

M. leuconeura (white-veined). A synonym of *Calathea leuconeura.*

M. l. Kerchoviana (Kerchove's). A synonym of *Calathea Kerchoviana.*

M. majestica (majestic). A synonym of *Calathea ornata majestica.*

M. Mazellii (Mazell's). *l.* shining, broad, rotundate, green at centre and margin, and marked with two broad grey bands. South America, 1871. A fine plant.

M. nitens (shining). *l.* palish green, glossy, barred with dark green lines. Brazil, 1880. An elegant ornamental plant.

Maranta—*continued.*

M. pinnato-picta (pinnately-marked). A synonym of *Calathea applicata.*

M. Porteana (Porte's).* *l.* oblong-acuminate, bright green on the upper side, striped with transverse bars of white; under surface rich purple. *h.* 3ft. Bahia, 1859. An elegant, erect-growing species.

M. regalis (regal). A synonym of *Calathea ornata regalis.*

M. roseo-lineata (rosy-lined). A synonym of *Calathea ornata roseo-lineata.*

M. roseo-picta (rosy-painted). A synonym of *Calathea roseo-picta.*

M. sagoriana (Sagorian).* *l.* oblong, very pale green, marked on each side the midrib with oblong-oblique bars of deep green. South America, 1862. A pretty dwarf perennial.

M. smaragdina (emerald-green).* *l.* emerald-green, with a dark green central stripe. Ecuador, 1870. SYN. *Calathea smaragdina.*

M. striata (streaked). *l.* about 5in. long, and 2in. wide, pale green, profusely streaked and striped with white and pale yellow. *h.* 6in. Philippines. A very desirable dwarf-growing species.

M. tessellata Kegeljani (Kegeljan's checkered). A synonym of *Calathea bella.*

MARANTEÆ. A tribe of *Scitamineæ.*

MARASMIUS (from *marasmos*, withering; on account of the plants being dry and leathery). A genus of Mushrooms characterised by not decaying readily, but by being so tough and leathery in all their parts that, after being quite dried, they can resume their form when again moistened. The cap is fixed to the stalk by the middle of the lower surface, and the gills are tough, and are not incised at all. The species are rather numerous. They are usually of small size. The best-known species in the genus is *M. oreades* (the Champignon or Fairy-ring Mushroom), common on lawns as one of the Fungi that make the so-called Fairy Rings.

FIG. 512. MARASMIUS OREADES.

This Mushroom (see Fig. 512) varies from 1in. to 2in. across the cap, and is provided with a stalk about 2in. or 3in. long. It is smooth above, and rather moist, striped at the margin, and pale reddish. The gills are nearly white. It has an agreeable odour, and is much esteemed as an article of food.

MARATTIA (named after J. F. Maratti, an Italian botanist, who published, in 1760, a book, "De Floribus Filicum"). Including *Eupodium* and *Gymnotheca.* ORD. *Filices.* A well-marked genus, comprising about eight species of stove or greenhouse evergreen Ferns, extending all round the world within the tropics, and a little beyond the Southern one. Capsules sessile or stalked, four to twelve, concrete in boat-shaped synangia, which consist of two opposite rows of capsules, and open by slits down their inner faces. The species are strong-growing, distinct, and very ornamental, and thrive best in a compost of equal parts loam, peat, and river sand.

Marattia—*continued.*

If Marattias are grown in a stove fernery, they should be placed partially in the water; being swamp-loving plants, they will grow more luxuriantly in such a situation. For general culture, *see* **Ferns.**

M. alata (winged). *sti.* 1ft. to 2ft. long, 1in. or more thick, scaly. *fronds* 3ft. to 4ft. long, tripinnatifid, the lower pinnæ the largest, the ultimate divisions ¼in. to ⅜in. long, about ⅛in. broad, oblong, the edge serrate or crenate; under surface more or less chaffy. *synangia* copious, sub-marginal, half a line to three-quarters of a line long, the sides erect, the attachment oblong or roundish. West Indies, &c., 1793. A very handsome plant, perhaps the best of the genus, thriving well in the cool fernery or conservatory. SYN. *Gymnotheca alata.*

M. attenuata (attenuated). *sti.* 3ft. to 4ft. long, smooth. *fronds* 3ft. to 4ft. long, tripinnate; pinnæ 1½ft. to 2ft. long, lower ones with a stalk 6in. long, and two or three pinnules on each side, the latter with a terminal segment and three or four on each side, which are 4in. to 6in. long, 1in. or more broad, apex serrated, base cuneate, lower ones short-stalked; surfaces naked; rachises not winged. *synangia* sub-marginal, the sides vertical; receptacle linear. Australia, 1863. Greenhouse.

M. cicutæfolia (Cicuta-leaved). *sti.* 1ft. to 2ft. long, 1in. thick, smooth. *fronds* 5ft. to 6ft. long, bipinnate; lower pinnæ, 1ft. to 1½ft. long, often 1ft. broad; pinnules oblong-lanceolate, 4in. to 6in. long, 1in. broad, edge entire or serrulate, base cuneate or slightly rounded; surfaces naked; rachis of pinnæ slightly winged towards the apex. *synangia* a short distance from the edge, deep-cleft. Brazil, 1878. Stove. SYN. *Gymnotheca cicutæfolia.*

M. elegans (elegant). This is a mere form of *M. fraxinea.*

M. fraxinea (ashen). *sti.* 1ft. to 2ft. long, 1in. to 1½in. thick, smooth, scaly and swollen in the lower part. *fronds* 6ft. to 15ft. long, bipinnate or casually tripinnate; pinnæ 1ft. to 2ft. long, often 1ft. broad; pinnules oblong-lanceolate, 4in. to 6in. long, ½in. to 1½in. broad, the apex acuminate, the edge entire or serrulate, the base cuneate or slightly rounded; surfaces naked. *synangia* usually sub-marginal, in close rows, half a line to one and a half lines long, the sides vertical, the receptacle linear, with from six to twelve capsules on each side. Guinea Coast. Stove. "From this," remarks Mr. J. G. Baker, "we cannot separate clearly many plants which have been regarded as distinct," of which the following are believed to be in cultivation: *M. purpurascens*, a reduced, fleshy form, as if grown in a very exposed situation; the fronds not more than from 3ft. to 4ft. high; lower pinnules often cut down to a distinctly-winged rachis. *M. salicifolia*, pinnules sharply toothed throughout, often only ½in. to ⅝in. broad. *synangia* with about six capsules on each side, not so close or so near the edge.

M. Kaulfussii (Kaulfuss'). *sti.* 2ft. to 3ft. long, thick, naked. *fronds* 3ft. to 4ft. long, quadripinnatifid; the lowest pinnæ much the largest, all except the lowest pair pinnatifid, 1ft. or more long, 6in. to 8in. broad; pinnules 3in. to 4in. long, the rachis very distinctly winged; segments oblong, deeply and bluntly toothed; surfaces naked. *synangia* half a line to three-quarters of a line long, not marginal, deeply cleft, the sides ultimately spreading. West Indies, &c. Stove. SYN. *Eupodium Kaulfussii.*

M. laxa (loose). *sti.* 1ft. to 2ft. long, smooth. *fronds* several feet long, bipinnate; lower pinnæ 1½ft. to 2ft. long, often 1ft. broad; pinnules oblong-lanceolate, 4in. to 6in. long, ⅜in. to 1in. broad, the edge inciso-crenate, the base cordate; surfaces naked; rachis slightly winged towards the apex. *synangia* quite close to the edge, three-quarters of a line to one line long, the sides always erect, the attachment linear. Mexico. Stove. SYN. *Gymnotheca laxa.*

M. purpurascens (purplish). A form of *M. fraxinea.*

M. salicifolia (Willow-leaved). A form of *M. fraxinea.*

MARCESCENT. Permanent; not falling off until the part which bears it is perfected, but withering long before that time; *e.g.*, flowers of *Lobelia, Orobanche*, &c.

MARCGRAVIEÆ. A tribe of *Ternstrœmiaceœ.*

MARESTAIL. A common name for **Hippuris vulgaris** (which *see*).

MARGYRICARPUS (from *margaron*, pearl, and *karpos*, a fruit; resemblance in white fruit). Pearl Fruit. ORD. *Rosaceœ.* A small genus (three species) of branched, rigid, leafy shrubs, of which one is broadly dispersed over the temperate regions of South America and the Andes of Patagonia, Brazil, and New Granada, another inhabits Chili, and a third Peru. Flowers small, inconspicuous, solitary in the axils, sessile. Leaves alternate, crowded, imbricated, variable. The undermentioned species is a pretty little hardy evergreen, well suited for the rockery; and should be so planted that its branches can rest on a dark-coloured stone, which will show up the fruit to advantage. A rich, light soil—such

Margyricarpus—*continued.*

as a mixture of sand, loam, and leaf mould—is most suitable. Propagated freely by cuttings, taken in summer, and pricked into moist peat, under a bell glass; or by layering the branches.

FIG. 513. MARGYRICARPUS SETOSUS, showing Habit and detached Portion of Fruiting Branch.

M. setosus (bristly).* *fl.* green, very small, axillary, sessile. All summer. *fr.* white, forming the main feature of attraction, ⅛in. to ¼in. in diameter, remaining in perfection a considerable time. *l.* impari-pinnate; leaflets awl-shaped, reflexed, deep green. *h.* 2ft. to 4ft. Andes, 1829. See Fig. 513.

MARIANTHUS (from *Maria*, Mary, and *anthos*, a flower; dedicated to the Virgin Mary). ORD. *Pittosporeæ*. A genus comprising about fourteen species of greenhouse under-shrubs, with procumbent, flexuous, or, more frequently, twining branches, limited to Australia. Flowers blue, white, or reddish, in terminal compact panicles, usually corymbose or almost umbellate, rarely solitary; petals connivent at base or above the middle, spreading at top. Leaves entire, toothed, or the lower ones occasionally lobed. This genus is sometimes confused with *Billardiera*, from which it differs in its capsular, not baccate, fruit. The species thrive in a compost of sandy loam and fibry peat, and are admirable plants for training on cylindrical trellises. Propagated, in April or May, by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in gentle bottom heat.

M. cæruleo-punctatus (blue-spotted). *fl.* greyish-blue, each petal with a black spot, in terminal heads. April. *l.*, first ones occasionally toothed or lobed; all the others quite entire; lower ones 3in. to 4in. long, upper ones 2in. to 3in. long. *h.* 4ft. 1840. (B. M. 3893.)

M. Drummondianus (Drummond's). *fl.* lilac; petals ¼in. long sepals hairy; pedicels terminal, one to three together. *l.* from obovate to oblong-lanceolate, mostly acute, or with a small recurved point, toothed or entire, sessile or narrowed into a short petiole; lowest ones sometimes deeply cut. 1865. Young shoots and leaves hairy, or rarely glabrous. (B. M. 5521.)

MARICA (from *maraino*, to flag; referring to the ephemeral nature of the flowers). ORD. *Irideæ*. A genus of about nine species of stove or greenhouse herbaceous perennials, of which one inhabits Western tropical Africa, and the rest are natives of Eastern tropical America. Perianth with three spreading outer, and three smaller inner, segments. Leaves coriaceous, elongate, ensiform. Rhizomes short. The few species in cultivation are very pretty plants, and thrive in a well-drained, rich compost of turfy loam, a little well decomposed manure, and a liberal proportion of sand. When in a growing state, and at flowering time, plenty of water must be supplied.

Marica—*continued.*

Propagated readily by division of the rhizomes, inserting each portion in sand, in a high bottom heat. When both shoots and roots are emitted, the young plants may be potted singly, and treated similarly to established plants. *See also* **Cipura.**

M. brachypus (short-stalked).* *fl.* yellow, barred at the base with horizontal brownish-red stripes. *l.* in a distichous rosette, ensiform, 1½ft. long. West Indies, 1871. A very fine stove species, resembling *M. Northiana* in general appearance. SYN. *Cypella brachypus*. (B. M. 6380.)

M. cærulea (blue).* *fl.* blue; claws of outer and inner perianth segments yellowish, barred with transverse bands of brown and orange; scape many-flowered, erect; spathe not viviparous; stigmas united, petal-like. May and June. *l.* bright green, 3ft. to 6ft. long, 1in. to 1½in. broad, acuminate. *h.* 2ft. Brazil, 1818. Stove. (B. R. 713.) SYN. *Cypella cærulea* (under which name it is figured in B. M. 5612).

M. gladiata (sword-shaped). A synonym of *Bobartia gladiata*.

M. gracilis (slender).* *fl.*, outer segments of the perianth white or bluish, and variously marked at the base; inner ones small, strangely curved, and spotted with reddish-brown, disposed on viviparous scapes. Summer. *l.* 1in. or more broad, tapering. *h.* 2ft. Brazil, 1830. Stove. (B. M. 3713.)

M. humilis (dwarf). *fl.*, limb of outer perianth segments whitish, with transverse bars of yellow and brown at the base; inner segments, upper portions blue and white, lower yellow, barred with orange-red. *l.* bright green, ensiform, bluntly acuminate. Brazil; previous to 1825. Stove. (L. B. C. 1081.)

M. h. lutea (yellow). A synonym of *M. lutea*.

M. lutea (yellow).* This species much resembles *M. humilis*, but may be distinguished by the following points: *fl.*, outer segment brighter yellow, with five (instead of four) bars of a redder colour; the ends of the inner ones white, with green bars (instead of plain purple). April. *l.* narrower and straighter. Stem short, bracteate; bracts inclosing the ramules longer and straighter. *h.* 6in. Brazil, 1840. Stove. (B. M. 3809, under name of *M. humilis lutea*.)

M. Northiana (North's).* *fl.*, outer segments of the perianth white, yellowish, and elegantly mottled with deep red at the base; inner ones curved, barred with blue at the apex, and veined with red at the base. June. *l.* 2ft. long, 2in. wide. *h.* 4ft. Brazil, 1789. A very handsome stove species, but rarely seen in cultivation. (B. M. 654.)

FIG. 514. AFRICAN MARIGOLD (TAGETES ERECTA).

MARIGOLD, or **MARYGOLD** (*Calendula officinalis*). A hardy annual, cultivated in kitchen gardens for the use of its flowers, which are gathered when open,

Marigold—*continued.*

dried slowly, and stored for use in soups, &c. Seeds should be sown in March or April, in drills 1ft. apart, and the plants thinned, in due course, to a similar distance. There are single and double-flowered varieties cultivated, both forming excellent mixed border plants, apart from their use referred to above. The half-hardy annual Marigolds employed in summer bedding and for mixed flower borders, belong to the genus *Tagetes*, the African (see Fig. 514) being *T. erecta*, and the French

FIG. 515. FRENCH MARIGOLD (TAGETES PATULA).

(see Fig. 515) *T. patula*. Lemon and orange-coloured varieties predominate in the African Marigolds, while the French sorts include, in addition to yellow, flower-heads of a rich velvety brown, beautifully striped and marked. Numerous dwarf strains are now obtainable, which, from their compact and floriferous habit, are very desirable and attractive garden plants. They are increased readily by seeds, which should be sown in a frame by the middle of April, and the seedlings afterwards transplanted outside. A moderately rich light soil is most favourable for Marigolds, and a space of about 9in. between the plants should be allowed in bedding arrangements.

MARIGOLD, MARSH. *See* **Caltha.**

MARILA (the native name of the tree in the Antilles). SYN. *Scyphœa*. ORD. *Ternstrœmiaceœ*. A small genus (four species) of very ornamental stove evergreen West Indian and South American trees or shrubs. Flowers disposed in axillary racemes; sepals and petals four or five, latter imbricated. Leaves opposite, parallel, penniveined. The undermentioned is the only species known to our gardens. For culture, *see* **Mahurea.**

M. racemosa (racemose). *fl.* greenish-white, in axillary racemes. August. *l.* opposite, oblong-lanceolate, elegantly veined, entire, full of pellucid dots. *h.* 15ft. West Indies, 1827. Tree or shrub.

MARIPOSA LILY. *See* **Calochortus.**

MARJORAM (*Origanum*). Marjoram is cultivated for the use of its aromatic leaves, either in a green or a dried state, for flavouring and other culinary purposes. The common species (*O. vulgare*) is a native hardy perennial, seldom grown in gardens. Two species generally cultivated are Sweet or Knotted Marjoram (*O. Majorana*),

Marjoram—*continued.*

and Pot Marjoram (*O. Onites*). Sweet Marjoram is not an annual, but is usually treated as such, as the plants will not stand the winter outside. Seeds may be sown, for an early supply, in March, on a gentle hotbed, and again, in a warm position, in the open ground, during April. The plants may be thinned, when large enough, to 6in. or 8in. apart. Cut the tops as they begin to flower, about July, and dry them slowly in the shade, for use in the following winter and spring. Pot Marjoram is a hardy perennial, which prefers a warm situation and a rather light soil. It is usually increased by divisions, in early spring, or by cuttings, inserted under a hand glass, in summer. A space of 1ft. between the rows, and nearly as much from plant to plant, should be allowed. The tops should be dried and preserved in the same way as Sweet Marjoram, and they may also be used for similar purposes.

MARLEA (its native name in Assam). SYNS. *Pseudalangium, Rhytidandra, Stylidium, Stylis*. ORD. *Cornaceœ*. A small genus (four or five species) of glabrous, pubescent, or tomentose, greenhouse trees or shrubs, natives of tropical and sub-tropical Asia, the warmer parts of Australia, and the Pacific Islands. Flowers white, hermaphrodite, disposed in axillary, simple or dichotomous cymes, with articulated pedicels; petals four to eight, free, or cohering in the base of the tube. Leaves alternate, petiolate, membranaceous, oblong-lanceolate or broadly-cordate, rotundate, oblique, entire or angularly lobed. The species best known to cultivation is *C. begoniæfolia*. It thrives in a compost of sandy loam and peat. Propagated by cuttings of short side shoots, detached with a heel, and inserted in sand, under glass.

M. begoniæfolia (Begonia-leaved). *fl.* yellowish, in axillary dichotomous cymes. Summer. *l.* alternate, exstipulate, petiolate, unequally cordate, acuminated, angularly lobed or entire. An evergreen shrub or tree, often small, but sometimes attaining a height of 60ft. Northern India, China, and Japan, 1824. (B. R. xxiv. 61.)

MARMORATE. Marbled; traversed by irregular veins of colour.

MARROW, VEGETABLE. *See* **Cucurbita Pepo ovifera** and **Vegetable Marrow.**

MARRUBIUM (the old Latin name used by Pliny, probably derived from the name of a town in Italy). ORD. *Labiatœ*. A genus comprising about thirty species of hardy perennial, usually tomentose or woolly herbs, of no horticultural value. Flowers in generally many-flowered axillary whorls. Leaves wrinkled, rarely cordate at the base, usually cut; floral leaves similar, exceeding the flowers. *M. vulgare* is the common **Horehound** (which *see* for culture).

MARSDENIA (named after William Marsden, F.R.S., 1754-1836, author of a History of Sumatra). Including *Harrisonia*. SYNS. *Leichardtia* and *Sicyocarpus*. ORD. *Asclepiadeœ*. This genus comprises about sixty species of stove, greenhouse, or half-hardy, twining or rarely sub-erect shrubs or sub-shrubs, disposed over the tropical regions of the New, as well as the Old, World, with one species extending to the East Mediterranean region. Flowers small or medium, much smaller than in *Stephanotis*; calyx five-parted; corolla campanulate, urceolate, or rarely salver-shaped or sub-rotate. Leaves opposite. Marsdenias thrive in a sandy loam, with a little leaf mould or peat. Propagated, during April or May, by cuttings, inserted in sand, under a bell glass, in gentle bottom heat.

M. Cundurango (Cundurango). *fl.* whitish; corolla between bell-shaped and funnel-shaped, very firm. Summer. *l.* stalked, oblong-rotundate, acute or acuminate, with greyish-yellow hairs beneath. Central America. Stove climber. SYN. *Gonolobus Cundurango*.

M. erecta (erect). *fl.* white, sweet-scented, numerous; segments of the corolla limb beardless; cymes umbel-formed. July.

Marsdenia—*continued.*

l. cordate-ovate, acute. Stem erect. *h.* 3ft. to 6ft. South-east Europe and Asia Minor, 1597. Half-hardy sub-erect shrub.

M. flavescens (yellowish). *fl.* yellowish; cymes many-flowered; corolla sub-rotate. June and July. *l.* oblong-lanceolate, acuminated, somewhat undulated, glabrous above, clothed with hoary tomentum beneath. New South Wales, 1823. Stove twining shrub. (B. M. 3289.)

M. loniceroides (Lonicera-like). *fl.* red; corolla fleshy, urceolate; umbels pedunculate, terminal. Autumn. *l.* opposite, decussate, 2in. to 3in. long, elliptic-cordate, obtuse. *h.* 6ft. Brazil, 1825. Erect stove shrub. (B. M. 2699, under name of *Harrisonia loniceroides.*)

M. maculata (spotted). *fl.* variegated, pale green and purplish-brown; cymes umbelliform, sub-sessile; sepals roundish, ciliate; corolla rotate-infundibular. June to August. *l.* broad-elliptic, spotted, cordate. *h.* 20ft. Trinidad, 1834. Plant glabrous. Stove climber. (B. M. 4299.)

M. suaveolens (sweet-scented). *fl.* white, fragrant; corolla with a ventricose tube and a bearded throat; panicles axillary, six to eight-flowered. July. *l.* oval-lanceolate, glabrous, veinless. Stem erect or twining. *h.* 2ft. to 3ft. New South Wales, 1816. Greenhouse shrub. (B. R. 489.)

M. tenacissima (very tough). *fl.* greenish-yellow; corolla salver-shaped, segments broad, obtuse; cymes large. June. *l.* cordate, acuminated, tomentose on both surfaces. Stem twining. India, 1806. Greenhouse shrub.

MARSHALLIA (named after Humphrey Marshall, an American botanical author, who published, in 1785, a list of the trees of the United States). SYNS. *Persoonia* (of Michaux), *Therolepta*, *Trattenikia*. ORD. *Compositæ*. A genus comprising four species of hardy perennial herbs, natives of North America. Flower-heads purplish or rose, resembling those of a Scabious, solitary; involucral scales linear-lanceolate, leafy, in one or two rows; receptacle convex or conical, chaffy; florets all tubular. The undermentioned species (the only one cultivated) is interesting rather than handsome, and is very suitable for borders in any light soil. Propagated by seeds, sown in a warm border, during late spring.

M. cæspitosa (tufted).* *fl.-heads* bluish-white, about 1½in. across. June. *l.* alternate, entire, glabrous, tufted. Stems several from the same tuft. *h.* 1ft. Texas, 1837. (B. M. 3704.)

MARSH CINQUEFOIL. *See* **Comarum.**

MARSH MALLOW. *See* **Althæa.**

MARSH MARIGOLD. *See* **Caltha.**

MARSH TREFOIL. *See* **Menyanthes trifoliata.**

MARSILEA (named after Count A. F. Marsigli, of Bologna, 1658-1730, a patron of botany). ORD. *Marsileæ*. This genus comprises about four species of aquatic plants, widely distributed. The two species described below are abundant in Australia. Two others are found in Europe, &c. Rhizome creeping, rooting at the nodes. Stipes often, but not always, confined at the base with those of the barren fronds, as in *Ophioglosseæ*. Barren fronds with a long petiole or stipes, the lamina divided into four digitate leaflets, with numerous forked veins radiating from their base. Sori linear, on transverse veins proceeding from the upper side or midrib of the involucre into two series of transverse cells; each sorus consists of a few macrosporangia, each one surrounded by several microsporangia; involucres sessile or stipitate. The species thrive in turfy loam or peat, and the pots in which the plants are growing should be partially plunged in water.

M. Drummondii (Drummond's). Stipes of the barren fronds usually long and slender; leaflets broadly obovate-cuneate, or fan-shaped, more or less crenate or shortly lobed, or rarely quite entire. *involucres* larger than in *M. hirsuta*, the stipes or peduncles clustered, free from the base. Ends of the rhizome, under side of the leaflets, and involucres, more or less silky-hairy. SYN. *M. macropus* (H. G. F. 63).

M. hirsuta (hairy). Young ends of the rhizome densely rusty-villous. Leaflets obovate or broadly cuneate, sparingly or densely hirsute underneath, the stipes usually long and slender. *involucres* small, usually clustered, sessile at the base of the barren fronds, or on a stipes shorter than the involucre.

M. macropus (long-stalked). A synonym of *M. Drummondii.*

MARSILEÆ. A small order of aquatic plants, of variable habit. There are no true leaves. Fronds, as in *Filices*, proceeding from the rhizome, and rolled inwards (circinate) at the top when young; barren ones either reduced to a linear stipes or bearing a leaflike lamina divided into four digitate leaflets; fertile ones on a shorter stipes or nearly sessile, the lamina recurved with the margins united, forming an ovoid or globular utricle, usually called an involucre. Spore cases of two kinds, as in some *Lycopodiaceæ*, but arranged, as in *Filices*, in sori inside the involucre (*i.e.*, on the under surface of the recurved frond); each sorus inclosed in a membranous indusium, apparently dividing the involucre into as many cells. The order is limited to the two Australian genera, *Marsilea* and *Pilularia*, both of which have a wide range in the New, as well as in the Old, World. According to Bentham, they might well be regarded as forming a tribe of *Filices*, to which they are much more closely allied than to *Lycopodiaceæ*, with some genera of which they have been frequently associated. The sporangia of *Marsilea*, after the pools in which the plants grow are dried up, are found in great abundance on the surface of the soil, and form a miserable article of food, which has, however, saved the lives of some of the exploring parties who have traversed Australia.

MARTAGON LILY. *See* **Lilium Martagon.**

MARTINEZIA (named in honour of Balthassar Martinez, a Spanish naturalist). SYN. *Aiphanes*. ORD. *Palmeæ*. A small genus (about seven species have been described) of very ornamental stove palms, rarely exceeding 20ft. in height, natives of tropical America. Flower-spikes simply branched, inclosed in a double spathe, the outer of which is incomplete. Fruit yellow, scarlet, or pink. Leaves pinnate; segments wedge-shaped or three-sided, the broad upper end very much jagged. Trunks cylindrical. The few species in cultivation thrive in a compost of sandy loam and peat, in about equal parts. A strong heat, and an abundance of water, are most essential to success. Propagated by seeds.

M. caryotæfolia (Caryota-leaved).* *l.* full dark green on both surfaces, pinnate, 3ft. to 6ft. long; pinnæ cuneate, præmorse, 6in. to 12in. long, 4in. to 6in. broad at the apex. Several pairs of pinnæ are produced in close proximity, at intervals of about 6in. to 10in. apart. Stem slender, and, as well as the petioles and back of the leaves, densely clothed with long black spines. New Grenada, 1845. (G. C. 1872, 171.)

FIG. 516. MARTINEZIA EROSA.

M. erosa (bitten). *l.* pinnate, consisting of a few pairs of narrowish leaflets at the base, and a pair of broader ones at the apex, all obliquely erose; both stalks and blades, the latter both above and beneath, thickly furnished with long, brown, needle-like spines, which, in the case of the blades, are developed from the rather prominent veins; leafstalks mealy. South America, 1871. See Fig. 516. (G. C. 1872, Fig. 296.)

Martinezia—*continued.*

M. granatensis (New Grenadan).* *l.* roundish-oblong or roundish-ovate in outline, entire at the base, bifid at the apex, evenly toothed along the edges; petioles and rachis armed with dark brown, needle-shaped spines, which vary from ½in. to 1in. long, and are spreading or deflexed. Columbia, 1874.

M. Lindeniana (Linden's). *l.*, upper surface bright green, paler below, pinnate; the terminal pinnæ much the larger; petiole sheathing, profusely armed with long, slender, black spines. *h.* 16ft. Columbia, 1869. (I. H. n. s. 99.)

MARTINIERIA. A synonym of **Kielmeyera** (which *see*).

MARTYNIA (named after John Martyn, F.R.S., 1699-1768, once Professor of Botany at Cambridge, author of "Historia Plantarum Variorum"). ORD. *Pedalineæ.* A genus comprising about ten species of erect or prostrate, clammy-pubescent, greenhouse herbs, sometimes annual, sometimes with a large tuberous perennial root, natives of the warmer regions of America. Flowers pink, violet, or pale yellowish, in short terminal racemes; corolla tube oblique or decurved at base, limb with five spreading lobes. Capsule subdrupaceous, terminating in two curved beaks or hooks

FIG. 517. FRUIT OF MARTYNIA LUTEA.

(see Fig. 517). Leaves opposite or alternate, long-stalked, cordate, thickly sinuate-toothed or palmately lobed. The best-known species is *M. fragrans.* This thrives in well-drained porous soil, in a warm, sheltered situation. Seeds should be sown, during the early part of spring, on a gentle hotbed, or in a warm, moist greenhouse, and the seedlings transferred to the open border about the latter part of June; or they may be grown on in pots for greenhouse decoration, if desired. The other species require similar treatment. All those described below are annuals.

M. annua (annual). A synonym of *M. proboscidea.*

Martynia—*continued.*

M. diandra (diandrous). *fl.*, thyrsoid in the forks of the stem, drooping; corolla with a white tube, tinged with purple, and spotted with red and yellow; limb pale red, with a shiny purple spot at each segment. July. *l.* opposite, lobed, cordate at the base, villous and viscid. Stem branched. *h.* 2ft. Mexico, 1731. (A. B. R. 575; B. R. 2001.)

M. fragrans (fragrant).* *fl.* crimson-purple, with a yellow throat, large, fragrant, disposed in handsome spikes. Summer and autumn. *fr.* very singular, prolonged upwards into two curved, sharp, hooked horns, 3in. to 4in. long. *l.* large, long-stalked, cordate, angled, coarsely-toothed. *h.* 2ft. Mexico, 1840. If gathered when very young, the fruit is said to make an agreeable pickle in vinegar. (B. M. 4292; B. R. xxvii. 6.)

M. lutea (yellow). *fl.* orange-yellow, suffused with blood-colour inside, large, funnel-shaped. August. *l.* opposite, cordate-orbicular, toothed, clothed with glandular down. Stem branched, downy. *h.* 1ft. to 2ft. Brazil, 1825. See Fig. 517. (B. R. 934.)

FIG. 518. MARTYNIA PROBOSCIDEA, showing Habit and detached Portion of Inflorescence.

M. proboscidea (proboscis-like).* *fl.* with a yellowish-white tube, variegated with green, yellow, and violet spots and lines; limb wide, pale violet, marked with saffron-coloured and violet dots and lines. July. *l.* alternate, lobed, cordate at the base. Stem branched. *h.* 1ft. to 3ft. Mexico, 1738. SYN. *M. annua.* See Fig. 518. (B. M. 1056.)

MARVEL OF PERU. *See* **Mirabilis Jalapa.**

MARYGOLD. *See* **Marigold.**

MASCARENHASIA (from the Mascarene Islands, where it is found). ORD. *Apocynaceæ.* This genus comprises about four species of stove shrubs or small trees, natives of Madagascar. Flowers whitish-purple, sub-sessile in the nodes, fasciculate or sub-solitary, terminal, or in one species scarcely axillary, large; calyx small, five-parted, the segments ovate or narrow; corolla salver-shaped, the tube cylindrical, the throat contracted; lobes five, ovate, twisted. Leaves opposite. For culture of the under-mentioned species, *see* **Dipladenia.**

M. Curnowiana (Curnow's).* *fl.*, corolla scarlet, glabrous; tube ⅔in. long, swollen above; lobes nearly 1in. long, ovate-lanceolate, acuminate; calyx of five subulate, erect teeth, much shorter than the corolla tube; cymes terminal, few-flowered; peduncles rather longer than the petioles; pedicels shorter. August. *l.* opposite, 3in. to 4in. long, shortly stalked, oblong or oblong-lanceolate, entire, obtusely pointed, the base acute and rounded; petioles ⅒in. long. A slender shrub. (B. M. 6612.)

MASDEVALLIA (named after Dr. Masdevall, a Spanish botanist and physician). ORD. *Orchideæ.* Of this genus upwards of 150 have been described as species. They are cool-house epiphytal Orchids, inhabiting the cool, wooded, mountainous regions of tropical America, from Peru to Mexico, a few being found in Brazil and Guiana. Flowers often beautifully coloured or variously spotted, medium or rather large, borne generally singly, but sometimes two or several, on radical stalks; sepals joined into a tube, except at their apices, where they are free, and drawn out into long, narrow tails; petals free, very small, concealed in the tube of the sepals, as is also the lip, which is sessile and articulated

Masdevallia—*continued.*

with the incurved, half-rounded column. Leaves coriaceous, narrowed downwards into petioles. Until a few years ago, Masdevallias did not find favour with English orchid-growers. This may, perhaps, be accounted for by the fact that the earliest introduced kinds were amongst the least showy of the whole genus. There is, however, another reason why the culture of Masdevallias has not yet become general, and that is, the difficulty of transit. Gathered in the high and cool mountain ravines of the Andes of Peru and New Grenada, at from 7000ft. to 10,000ft. elevation, they are packed in boxes, and have, perchance, to make a journey upon a mule's back for some two or three weeks before they reach the port of embarkation, every day's journey bringing them into a hotter region. The effect of this is that the plants are soon shrivelled up; and, as they have no pseudo-bulbs, in which to store nourishment, they are, in many instances, found, upon arrival in this country, to be a mass of useless rubbish. The plants flower two or three times in the course of the season. Masdevallias are not difficult to cultivate; indeed, there is, probably, no other genus of orchids which can be grown with so little trouble as the one under notice, providing always they have a cool, moist atmosphere, and are well shaded from the sun in summer. The plants thrive in peat and sphagnum, with good drainage, and are propagated by division.

M. abbreviata (shortened). *fl.* white, with a few purple spots; racemes few-flowered. *l.* spathulate, obtuse. Columbia, 1878. Closely allied to *M. polysticta*, but the flowers have usually far fewer dots.

M. amabilis (lovely).* *fl.* orange-carmine. *l.* oblong-ovate, about 5in. long. *h.* 6in. Peru, 1874. A very pretty, free-flowering species. (I. H. n. s. 196.)

M. anchorifera (anchor-bearing). *fl.* purple; the borders of the side sepals ochre, with purple spots; tails recurved raceme distichous; peduncle smooth. Costa Rica, 1884.

M. Arminii (Armin's). *fl.* rose-coloured, tinged with purple when expanded.

M. attenuata (attenuated). *fl.* greenish-white; sepaline tails orange-yellow; petals white, with a green middle nerve; lip yellow. *l.* long-staiked, linear-ligulate. Costa Rica, 1871. (B. M. 6273.)

M. Backhousiana (Backhouse's).* A fine species or variety, closely related to *M. Chimæra*, but the colours are much brighter and the flower much larger. Columbia, 1879.

M. Barlæana (Barla's). *fl.* scarlet, very freely produced. Peru, 1876. A pretty species, closely allied to *M. amabilis*.

M. bella (handsome).* *fl.* dark purplish-brown, yellow inside, large; the odd sepal and the outer halves of the other sepals are densely blotched with dark purplish-brown, the colour of the long tails; the interior sides of the equal sepals and the base of the odd sepal are nearly ochre-yellow in colour. Columbia, 1878. (B. H. 1884, 57; G. C. n. s., xiii. p. 756.)

M. brevis (short). *fl.*, upper sepal yellow, with three rows of purple spots and a dark purple tail; lateral ones having the upper front area orange and purple, the rest brown; petals yellowish and brown, rhomboid, with an inflexed point; lip long, narrow, stalked, with a pandurate fimbriate blade. British Guiana, 1884.

M. calura (beautiful-tailed). *fl.*, petals and lip brownish-purple, the inner surface covered with obtuse warts; column white, with numerous purple freckles; tails long. 1883.

M. campyloglossa (curved-lipped). *fl.* greenish-white, smaller than in *M. coriacea*, with nine purplish-black dots over the nerves; tails narrower, split half the length of the perigone; lip whitish, with three violet stripes, long, narrow, acute, angled on each side near the apex. 1878.

M. chelsoni (Chelsea).* *fl.* white; lip pandurate, mauve at the border, brown at the blunt apex, white on the disk of the inner side, with a mauve line through the middle line beneath. *l.* with a very long petiolar part. 1880. A hybrid between *M. Veitchiana* and *M. amabilis*; it is believed to be the first Masdevallia raised from seed in Europe.

M. Chestertoni (Chesterton's). *fl.* greenish-sulphur, spotted black; sepals ovate, with black tails; petals orange, with two black spots and a tumour. Columbia, 1883. Allied to *M. Nycterina*.

M. Chimæra (Chimæra).* This plant is distinguished from *M. Wallisii* (which is usually grown under the name of *M. Chimæra*) by its very long, acuminate, tapering, triangular sepals, 10in. to 12in. long, blackish, dotted, and hairy, and by the lip having no angle at its base. (G. C. n. s., xvi. Fig. 26.)

Masdevallia—*continued.*

M. civilis (civil). *fl.* greenish-yellow, spotted inside with brown; sepals fused into a tube, terminating in three slender tails. *l.* fleshy, 4in. to 6in. long. Peru, 1864. (B. M. 5476.)

M. coccinea (scarlet).* *fl.*, sepals yellow outside, and, to use the words of Dr. Lindley, as red as a soldier's coat within; lower sepals expanded and folded back, whilst the upper sepal is narrow and inclined to reflex. Winter. Pamplona, New Grenada. A rare but handsome species. (R. G. 870; R. X. O. 74.)

M. coriacea (leathery). *fl.* yellowish, spotted with brownish-purple. *h.* 6in. Columbia, 1872. An interesting species.

M. corniculata (horned). *fl.* dark cinnamon-brown, as large as those of *M. coriacea*; petals terminating in an ascending, columnar, warty body. Columbia, 1878.

M. crassicaudata (thick-tailed). A variety of *M. polysticta*.

M. cucullata (hooded). *fl.* glossy blackish-purple, whitish inside at base; tips of tails yellow. Columbia, 1883. A fine species.

M. Davisii (Davis').* *fl.* rich orange-yellow, solitary. *l.* about 8in. long. Peru, 1874. A distinct and handsome species. (B. M. 6190.)

M. Dayana (Day's). *fl.*, upper sepal yellowish-white, with seven membranous keels spotted with purple; inferior connate sepals orange, with some purple-brown spots and borders towards the apex. *l.* flat, dark green above, purple beneath, 4½in. by 3in. Columbia, 1880.

M. Denisoniana (Denison's). *fl.* dark crimson, with a magenta flush, very brilliant. Columbia, 1873. Plant of dwarf tufted habit. (F. M. n. s. 79.)

M. Eduardi (Edward Klaboch's). *fl.* red, two or three, borne on peduncles nearly 9in. high. *l.*, blades scarcely above ½in. long and ⅔in. wide, produced at intervals of about 1in. along the creeping rhizome. Columbia, 1880. A pretty species.

M. ephippium (saddle).* *fl.* dark purplish-brown, with very long yellowish tails; veins of lower sepals washed outside with yellow; scape pluriflorous. *l.* oblong, obtuse, with long petioles. *h.* 1ft. Antioquia, 1874. SYN. *M. Trochilus*. (B. M. 6208; R. X. O. 195.)

M. erinacea (prickly). *fl.* light ochre, with a dark purple ring on the rough ovary, and a few scattered spots, small; tails and disks of lateral sepals orange. *l.* linear-spathulate, 2in. long, obscurely tridentate. 1881. A small species.

M. erythrochæte (red-bristled).* *fl.* white and light yellow; sepals covered inside with styliform processes; tails reddish-purple; peduncles 4in. long. *l.* 1ft. long, ⅔in. broad. Central America, 1882. This resembles *M. Houtteana*, but is larger.

M. Estradæ (Estrada's).* *fl.* with a purplish-mauve ground colour, the long sepals being pale yellow; scape erect, one-flowered. April. *l.* oblong-ovate, coriaceous, deep green, about 4in. long. New Grenada, 1874. A dwarf and profuse-flowering species. (B. H. 157, 21; B. M. 6171.)

M. floribunda (bundle-flowered).* *fl.* in a terminal umbel or corymb; petals white, with a triangular or square production on the inferior side, and a keel on the blade, retuse at its top, with three teeth; inferior sepals rounded at the top and suddenly extended into a short tail; the very small free part of the upper sepal is triangular, tapering into a tail; the tails are of a pretty yellow; lip nearly cordate at the base, constricted before the middle, whitish, with numerous brownish-purple spots. *l.* rather thick, spathulate, shining. Brazil, 1843.

M. Gargantua (Gargantua). *fl.* leather-yellow; lower part of tube velvet-purple, with three whitish stripes on each side; lip blackish-purple, rough; petals and column white, striped with lake. Columbia, 1876.

M. Gaskelliana (Gaskell's).* *fl.* mauve-purple outside, with two yellow areas at the base and apex of the lateral sepals, and light yellowish, spotted with mauve, inside; tails mauve-purple. *l.* narrow-lanceolate, acute, 4in. long. 1883. An elegant plant.

M. gemmata (twin).* *fl.*, dorsal sepal ochreous, triangular, with an orange tail of equal length; lateral sepals larger, oblique, ochreous at base, with orange nerves, the front part purple; tails orange, nearly as long as the body of the sepal; lip purple, cordate. *l.* linear-cuneate, 2in. long, obscurely tridentate at apex. 1883. A pretty dwarf species.

M. gibberosa (warted). *fl.* dark reddish; sepals connate at base, ascending, curved and bent when free, tails of lateral ones green; pedicels jointed to the ovaries; peduncle loosely racemose, covered with numerous warts. *l.* cuneate-ligulate, acute, very narrow above the articulation. *h.* 6in. Columbia, 1876.

M. gracilenta (slender). *fl.* blackish-purple, solitary or in pairs. *l.* oblong, acute, minutely three-toothed. Stems slender, 5in. to 7in. high, including the leaves. Costa Rica, 1875.

M. Gustavi (Gustav Wallis's). *fl.* yellowish, with a profusion of port-wine-coloured dots, and yellow tails, ½in. long, racemose. *l.* slender, lanceolate, on long petioles. New Grenada, 1875.

M. Harryana (Mr. Harry Veitch's). A synonym of *M. Lindeni*.

M. heteroptera (various-winged). *fl.* quite open; upper sepal yellow, transversely barred with blackish-purple, oblong, with a short yellow tail; lateral sepals blackish-purple, narrower, convolute, with longer yellow tails; petals white; lip blackish-purple. New Grenada, 1875. A very pretty dwarf plant.

M. hieroglyphica (hieroglyphic). *fl.*, upper sepal erect, flat, with three dark lines and numerous dark spots; lateral ones

Masdevallia—*continued.*

nearly square, marked with a dark purple-brown area, and the long tails suddenly bent down. Columbia, 1882. A distinct plant.

M. Houtteana (Van Houtte's). *fl.*, sepals creamy-white, profusely spotted with blood-red, broad, each lengthened out into a thick, terete, red tail, and measuring from 2in. to 3in. long; scape one-flowered. July. *l.* 1ft. long, ¼in. broad. Columbia, 1874. (F. d. S. 2106.)

M. hypodiscus (beneath-disk). *fl.* deep purplish-violet, with a long narrow opening on each side, and having numerous whitish fringed crests all over the principal veins. *l.* lilac-purplish beneath, on long bent petioles. 1878. A fine species.

FIG. 519. FLOWER OF MASDEVALLIA IGNEA.

M. ignea (fiery).* *fl.* of a bright fiery red, often deeply shaded with crimson or violet-rose; upper sepal narrow, especially towards the apex, bent over the flower, by which peculiarity this species is easily recognised; scape one-flowered. *l.* on long petioles, oblong, obtuse. *h.* 6in. Columbia, 1871. The dazzling lustre of the flowers "is due to the refractive power of the fluid contained in the superficial bladdery cells of the sepals, and is, perhaps, unsurpassed for brilliancy in the vegetable kingdom." See Fig. 519. (B. M. 5962.) The variety *Marshalliana* has yellowish flowers, while *Stobartiana* has mauve-purple nerves.

M. inæqualis (unequal). *fl.* yellowish-white, finely spotted with purple, somewhat cup-shaped, but well expanded, with three slender tails, 1in. long. *h.* 6in. Columbia, 1874.

M. inflata (inflated). A species resembling *M. corniculata*, but the triangular bract is much wider and shorter, keeled at back. The flower is shorter, orange-yellow, and very much inflated.

M. infracta (broken). *fl.* whitish, dotted with brown, and furnished with yellow tails. Brazil, 1835. (B. H. 1873, 22.)

M. ionocharis (violet-beauty).* *fl.* whitish-yellow, with a large purplish blotch, and a few similar smaller ones. September. *l.* oblong, with a very narrow petiolar part. *h.* 4in. Peru, 1875. (B. M. 6262.)

M. Klabochorum (Klaboch's). *fl.* blackish-grey outside, white inside, with petals, lip, column, and tails yellow, when fully open 3in. in diameter from tip to tip of tails; peduncle one-flowered. *l.* oblong, obtuse. South-west America, 1876. A very distinct plant.

M. lata (broad). *fl.* dark brownish-red; broad lateral sepals forming part of tube very concave; tails yellowish; peduncle thin, two-flowered. Central America, 1877.

M. Lehmanni (Lehmann's). *fl.* orange-yellow; peduncle 9in. high. *l.* oblong, acute, shorter than the peduncle, on long petioles. Ecuador, 1877. This plant is something in the way of *M. polysticta*.

M. leontoglossa (lion's-tongue). *fl.* lemon and ochre, spotted with dark purple; lateral sepals united nearly to their apex; petals white, with two purple streaks; lip also white, with purple warts and blotches. 1881.

M. Lindeni (Linden's).* *fl.* brilliant violet, rose, or magenta, with a white eye, borne singly on a peduncle, which is considerably longer than the leaves. Winter and early spring. *l.* oblong-lanceolate. New Grenada, 1869. SYN. *M. Harryana*. See Fig. 520. (F. M. 28.) The following are, amongst others, three handsome varieties: *acanthifolia*, with rich violet-rose coloured flowers; *conchiflora*, with rich rosy-lake flowers; and *regalis*, with dark glowing crimson flowers.

M. Livingstoneana (Livingstone's). *fl.* greenish-yellow, with an elongated cup, brown at the apex; lateral sepals having dark purplish-brown, eye-like spots at the base. *l.* spathulate-obovate, obtusely emarginate. Panama, 1874. Habit tufted.

Masdevallia—*continued.*

M. longicaudata (long-tailed). *fl.* rosy-white, deep rose inside, bell-shaped; tails upwards of 1in. long; scapes one or two-flowered. *l.* elliptic-oblong, fascicled. Brazil, 1869. (I. H. 1868, 109.)

M. ludibunda (sportive). *fl.* light yellowish, purple-spotted; tails dark yellowish. Columbia, 1882. This form resembles *M. Estradæ*, but the sepals are rounder, the tails longer, and the lip pandurate. (F. & P. 1882, 37.)

M. macrodactyla (long-fingered). *fl.* greenish-yellow, racemose; lip blackish-purple. *l.* cuneate-oblong. New Grenada, 1872.

M. macrura (long-tailed). *fl.* solitary; "the wide tube itself is very short, of firm texture, and slit into an upper and an inferior lip; the upper lip forms a short triangle, extending in a long, strong tail; the inferior lip is longer and broader, dividing in two long, strong, spreading tails; these tails are light yellow, the bodies themselves of the sepals light brownish, with dark purplish-brown spots; the petals, column, and lip, form, as usual, a small body, yellowish, with purplish dots, the middle lobe of lip being orange-yellow" (Reichenbach). Winter. *l.* 2in. to 3in. long. *h.* 1ft. Columbia, 1874. (G. C. n. s., vii. p. 13.)

M. maculata (spotted). *fl.*, sepals 2½in. long, the upper ones yellow, the lower ones purple, tipped with green. *l.* spathulate. New Grenada, 1873. (F. d. S. 2150.)

FIG. 520. MASDEVALLIA LINDENI.

M. marginella (margined). *fl.* white, with the three main ribs and tail green, the latter bordered with orange, and orange outside; lobes and tails spreading, the latter as long as the rest of the flower; raceme one or two-flowered. *l.* broadly spathulate, shortly stalked. 1883.

M. melanopus (black-stalked).* *fl.* white, with purplish dots and yellow tails. *h.* 6in. Peru, 1874. (B. M. 6258, under name of *M. polysticta*.)

M. melanoxantha (blackish-yellow). *fl.* 1in. long, with a short yellow tube; upper sepal yellowish, linear, acuminate; lower ones whitish-green outside, covered with small brownish warts, broader, bifid. *l.* ligulate, 1in. long, attenuated at base. New Grenada, 1875. A curious orchid.

M. Mooreana (Moore's). *fl.* yellowish or light green outside, with darker nerves and a reddish hue under the lateral sepals; inside chocolate-brown, very rough; tails long. 1884.

M. muscosa (mossy). *fl.* yellowish, reddish-nerved; petals with very peculiar dilated apices; lip deep violet, bearded; peduncles hispid, two-flowered. New Grenada, 1875.

M. myriostigma (many-dotted). *fl.* yellowish, with small brown dots. *l.* oblong-spathulate. Mexico, 1874. A peculiar plant. (B. H. 1873, 23.)

Masdevallia—*continued.*

M. Nycterina (Nycterina). *fl.* pale yellow, finely blotched with reddish-brown, and covered with minute hairs; triangular in shape. *h.* 8in. Columbia, 1873. A pretty species for growing in a basket; it was first sent out by Linden as *M. Chimæra*, to which, however, it is much inferior. (F. M. n. s. 150; G. C. n. s., xvi. 337.)

M. pachyantha (thick-anthered). *fl.* yellowish-ochre, or green lilac-brownish, with dark nerves on the upper sepals, and fainter ones on the lateral sepals; upper sepals triangular, with a long, thick tail; lateral ones deeply connate, with a short, thick tail. Columbia, 1884. This species somewhat resembles *M. Gargantua*.

M. pachyura (thick-tailed). *fl.* yellow, small, with numerous brownish-red spots, disposed in many-flowered racemes. Northern Peru, 1874.

M. Parlatoreana (Parlatore's). *fl.* salmon-colour outside, finest scarlet, with amethyst warts, inside; lip oblong, with obscure lateral blunt lobes, white, with a very dark violet spot at the top. Peru, 1879. Allied to *M. Barlœana*.

M. Peristeria (dove). *fl.* honey-coloured, with very strong green ribs outside; lip amethyst-coloured. *h.* 6in. Columbia, 1873. (B. M. 6159.)

M. picturata (variegated). *fl.*, sepals whitish, oblong, quite free, with green nerves and tails, and spotted with blackish-purple, the lateral ones orange at the base; peduncles one-flowered. *h.* 2in. to 3in. Columbia, 1882. A small but pretty species.

M. platyglossa (broad-tongued). *fl.* light yellowish, small; tails short; lip broad, full of acute warts at the top. 1883.

M. polysticta (many-dotted).* *fl.* white, beautifully spotted with dark crimson; scape six to eight-flowered. *h.* 6in. Peru, 1874. One of the most attractive of the small-flowering species. (G. C. n. s., iii. 657.) *M. crassicaudata* is a variety with short, stout tails.

M. polysticta (many-dotted), of Hooker. A synonym of *M. melanopus*.

M. porcelliceps (pig-snout). *fl.* yellowish, speckled with brown; petals white; lip covered with brown warts, rhomboid. 1883. A small but pretty species.

M. psittacina (parrot-like). *fl.* dull-coloured, small, solitary. Columbia, 1876.

M. pulvinaris (cushioned). *fl.* olive-green, with purplish tails and blotches; remarkable for the two cushions on the lower connate sepals. 1880.

M. radiosa (radiating). *fl.*, sepals light ochre-coloured on the internal upper part; the larger inner part looks blackish-purple, from being densely covered with blackish warts on a purplish ground; petals whitish, with a brown blotch at the base; lip white, with the upper surface of the radiating dissepiments reddish, and with a few fringes at the black apex. Columbia, 1877.

M. Reichenbachiana (Reichenbach's).* *fl.* 2in. long; the funnel-shaped tube and slender tails whitish-yellow, with the back part blood-red. *l.* spathulate, narrowed towards the base, tridentate at apex. Costa Rica, 1875. *aurantiaca* is a fine variety, with rich orange lateral sepals.

M. Roezlii (Roezl's).* *fl.*, sepals blackish india-purple, with darker warts, and having a few short light purple hairs on the edges; petals light mauve, with some dark-eyed blotches; lip also light mauve. Columbia, 1880. A handsome plant. (R. X. O. ii. 186.)

M. rosea (rosy). *fl.* rosy-purple, about 2in. long, solitary. Columbia, 1880. A handsome species. (G. C. n. s., xiii. 680.)

M. Schlimii (Schlim's).* *fl.* yellow, mottled with brownish-red spots; the combined body of the two lower sepals produced much beyond that of the upper one, and somewhat pandurate in outline; tails 1in. long; scape three to six-flowered, twice as long as the leaves. *l.* spathulate-elliptic, 6in. to 12in. long. Venezuela, 1884. A large and rather showy species. (B. M. 6740; G. C. n. s., xix. Fig. 80.)

M. severa (severe). *fl.* port-wine-brown or maroon, transversely barred with yellow; the asperities ending in short bristles. *l.* large, spathulate-oblong. Columbia, 1875. This plant is allied to *M. Chimæra*, *M. Roezlii*, and *M. Shuttleworthii*.

M. Shuttleworthii (Shuttleworth's).* *fl.* richly streaked with purple, green, and yellow; sepals spreading, with long tails. *h.* 4in. Columbia, 1874. A very pretty species. (B. M. 6372.) *xanthocorys* is a variety with a nearly yellow dorsal sepal, finely striped with brown lines.

M. simula (pug-nosed). *fl.* purplish, honey-coloured in front, small; upper sepal purplish, with pellucid bars. *l.* linear-lanceolate. New Grenada, 1875.

M. spectrum (spectre). *fl.* disposed in three-flowered racemes; sepals narrow, mottled with violaceous or blackish-purple dots, and having yellow tails as long as themselves. Columbia, 1875. Allied to *M. severa*.

M. splendida (splendid).* *fl.*, tube rich scarlet, with a violet sheen, long and slender, with abrupt tails; petals white; lip white, with a violet disk, and a dark violet knob at the apex Andes, 1878. A beautiful species, somewhat resembling *M. Veitchiana*.

Masdevallia—*continued.*

M. swertiæfolia (Swertia-leaved). *fl.* variously-coloured; at first ochre, with brown spots; afterwards purple, with the exception of the inner sides of the lateral sepals and their tails, which are yellow; peduncles one or several-flowered. *l.* resembling those of *Swertia perennis*. New Grenada, 1880. A curious plant.

M. torta (twisted). *fl.* light ochre, dotted and striped with purple, broad-cupped; tails yellow inside, the lateral ones twisted. *l.* cuneate-ligulate, acute, bidentate, on long petioles. 1883.

FIG. 521. LEAVES AND FLOWERS OF MASDEVALLIA TOVARENSIS.

M. tovarensis (Tovar).* *fl.* pure white, usually in pairs on a peduncle which springs from the base of, and is a little longer than, the leaves. Autumn and winter. *l.* somewhat spathulate, coriaceous, deep green, erect, about 6in. high. Tovar, Columbia, 1865. See Fig. 521. (B. M. 5505.)

M. triangularis (three-angled). *fl.*, sepals expanding widely, light ochre-colour, with innumerable light, elegant, brownish-purple spots; petals small, white; lip rhombic, white, spotted all over with purple spots; its opposite part shows two triangular side laciniæ and a cuneate-oblong, fringed, small, blackish-purple middle lacinia: these latter-mentioned parts are reflexed in a very elegant manner. Winter. *l.* cuneate-oblong. Venezuela, 1842.

M. triaristella (three-bristled).* *fl.* brown and yellow; lower sepals connate into a boat-shaped lip, with a long bristle on each side; upper sepal also ending in a bristle, 2in. from end of upper

Masdevallia—*continued.*

to end of lower sepal; petals whitish; peduncles one or two-flowered, minutely warted, 4in. to 5in. long. *l.* canaliculate, 1in. long, terete. Costa Rica, 1876. Very distinct. (B. M. 6268.)

M. trichæte (three-bristled). This much resembles *M. triglochin*, but has longer leaves and smaller flowers, the latter of a rich brown-purple, with orange tails, and some parts of the base orange, with brown nerves. *h.* 3in.

M. tridactylites (three-fingered). *fl.* small; dorsal sepal yellow; lateral ones brownish-purple; tails orange, sigmoid, blunt; peduncles very slender. *l.* very thin, semi-terete, acute, channelled.

M. triglochin (three-hooked).* *fl.* small but beautiful, borne, several in succession, on a peduncle not much longer than the leaves; sepals red, with yellow tails; petals pale yellow, blotched with red on the disk; lip pale, with some red on each side at base. *l.* light glaucous-green, spotted with violet beneath, 1½in. long, thick, narrow, spathulate-cuneate, acute. Ecuador, 1878. A very dwarf plant, of neat habit.

M. Trochilus (Trochilus). A synonym of *M. ephippium.*

M. troglodytes (Troglodyte). *fl.* whitish outside, inside and tails purple-brown, mottled on the margin with yellow, spotted on the sides and apex with red-brown; tails almost equal, 1½in. to 2in. long; perianth open, ⅔in. in diameter; scape one-flowered. *l.* linear-lanceolate, tridentate at apex. Columbia, 1878. (B. H. 1877, 5.)

M. Tubeana (Tube's). *fl.*, sepals brownish-violet, with a yellow base and rather long tails; petals white, as are also the lip and column. *l.* soft, cuneate-oblong, acute, 1ft. long, petiolate. Ecuador, 1878.

M. urostachya (tail-spiked). *fl.* dark brown, with small orange markings, more numerous, longer-stalked, and smaller than in *M. Schlimii*, which this plant otherwise resembles. 1882.

M. Veitchiana (Veitch's).* *fl.* solitary; outer surface of the sepals tawny-yellow, the inner surface rich orange-scarlet; nearly the whole of this portion is densely set with short, erect, woolly glands, or papillæ, which are tipped with rich purple. Autumn and winter. *l.* about 8in. long, coriaceous, dark green. Peru, 1867. Probably the finest species yet introduced. (B. M. 5739.) *grandiflora* is a magnificent form, with very large flowers.

M. velutina (velvety). *fl.* rosy-violet and white, velvety within, as large as those of *M. Estradæ*, but with longer tails; peduncle slender, dark violet, one-flowered. *l.* ligulate, in dense tufts. *h.* 6in. Columbia, 1875.

M. vespertilio (bat-like). *fl.*, sepals pale yellow, blotched with brownish-purple, having numerous yellow bristles inside, and yellow tails longer than their body; petals brown and yellow, small; the lip is extended in a broad, transverse, keelless epichile, the small hypochile with a somewhat horseshoe-like, blunt, angular keel; column white. Columbia, 1877.

M. Wageneriana (Wagener's). *fl.* yellow, with a rhomboid toothleted lip. *l.* small, short-stalked, very thick. *h.* 4in. Central America. (B. M. 4921.)

M. Wallisii (Wallis's).* *fl.* yellow, spotted with blood-red, 8in. from tip to tip of the dorsal and lateral sepals; sepals hispid with soft, spreading hairs on the inner surface, suddenly contracted into slender red-purple tails, 3in. long; margins reflexed; petals very short, ⅓in. long; lip ⅓in. long, spathulate. December. *l.* narrowly oblanceolate, acute, 6in. to 9in. long. New Grenada. This plant is usually cultivated under the name of *M. Chimæra*, and is figured as such in B. M. 6152. *discoidea* is a pretty variety, with a white disk at the apex of each sepal, and with a stronger beard.

M. Winniana (Winn's). This species is similar to *M. Roezlii*, but larger; the flowers are lighter in colour, with more gradually tapering sepals, and an erect peduncle. 1881.

M. xanthina (yellow). *fl.* bright yellow, dark violet at the very base of even sepals, which are a little narrower than the odd one; lip yellowish, with a knob at the apex. *l.* cuneate-oblong. 1880.

M. xanthodactyla (yellow-fingered). *fl.* greenish-white, with yellow tails; lip and column nicely mottled and marbled with dark brownish-violet. October. Tropical America, 1877.

MASSANGEA (named after M. Massange de Louvrex, a distinguished Belgian horticulturist). ORD. *Bromeliaceæ.* A small genus of stove herbaceous perennials, now included, by Bentham and Hooker, under *Caraguata.*

Massangea—*continued.*

They are grown principally on account of the elegance of their leaves. For culture, *see* **Billbergia.**

FIG. 522. MASSANGEA HIEROGLYPHICA.

M. hieroglyphica (hieroglyphic).* *l.* dark green, banded with violet-black, and having hieroglyphic markings. Brazil, 1878. See Fig. 522. (R. H. 1878, 175.)

M. Lindeni (Linden's). *l.* ligulate-oblong, abruptly acuminate, greyish, marked with transverse, narrow, wavy bars of violet-brown. Peru, 1878. (I. H. 1878, 309.)

M. musaica (mosaic).* *fl.* in terminal close heads on an erect scape, provided with scarlet bracts; corolla snow-white; calyx brownish, ivory-white at the apex. Spring. *l.* ligulate, recurved at the apex, 1ft. long, 2in. broad, yellowish-green, marked irregularly with patches of dark green, which present a mosaic appearance. *h.* 1ft. Columbia, 1873. SYNS. *Tillandsia musaica* and *Vriesia musaica.* (B. H. 1877, 8, 9.)

MASSONIA (named after F. Masson, 1741-1805, a botanical traveller in South Africa). SYN. *Podocallis.* ORD. *Liliaceæ.* A genus comprising, according to Mr. Baker, about twenty-five species of small-growing, greenhouse, bulbous plants, natives of South Africa. Flowers white, in an umbel-like head, nearly sessile between the leaves, and surrounded by a many-leaved scarious involucre; perianth with a cylindrical erect tube, and a six-cleft, spreading or reflexed limb; scape short or none. Leaves radical, twin, nearly opposite, spreading, ovate or rarely oblong. The species are more curious than beautiful. They thrive in sandy peat, and, as is the case with most South African bulbous plants, like a decided season of rest.

M. angustifolia (narrow-leaved). *fl.*, perianth white; segments linear, reflexed, half as long as the tube; corymbs shortly pedunculate, six to twenty-flowered. April. *l.* lanceolate, ascendent, acute, 3in. to 4in. long, 1in. broad. 1775. (B. M. 736.)

M. candida (white). *fl.*, perianth white, nearly 1in. long; segments linear-lanceolate, reflexed; corymbs twenty to thirty-flowered. April. *l.* round, smooth, obtuse, fleshy-herbaceous, 3in. to 5in. long and broad. *h.* 6in. (B. R. 694.)

M. ensifolia (sword-shape-leaved). *fl.*, perianth lilac, ⅔in. to 1in. long; segments linear-ligulate, spreading; corymbs three to twelve-flowered. April. *l.* fleshy-herbaceous, lanceolate, 2in. to 4in. long, 1in. to 1½in. broad. *h.* 6in. 1790. (B. M. 554; A. B. R. 46, under name of *M. violacea.*)

M. latifolia (broad-leaved). A synonym of *M. sanguinea.*

M. muricata (muricated). *fl.*, perianth white, 1in. long; segments lanceolate, reflexed, about half as long as the tube. April. *l.* fleshy-herbaceous, round-cordate, 3in. to 4in. long and broad. *h.* 6in. 1790. (B. M. 559.)

M. pustulata (blistered). *fl.*, perianth 1in. long; segments linear-lanceolate, reflexed, half the length of the tube; filaments white; corymbs ten to twenty-flowered. February. *l.* ovate

Massonia—*continued.*

rotundate, fleshy-herbaceous, smooth, sub-acute, 5in. to 6in. long, 3in. to 4in. broad. *h.* 3in. 1790. SYN. *M. scabra.* (B. M. 642.)

M. sanguinea (bloody). *fl.*, perianth white, nearly 1in. long; segments linear-lanceolate; filaments suffused with red; corymbs fifteen to twenty-flowered. March. *l.* fleshy-herbaceous, almost rotundate-cordate, acute, 4in. to 6in. long, 3in. to 4in. broad. *h.* 6in. 1775. SYN. *M. latifolia* (under which name it is figured in B. M. 848).

M. scabra (scabrous). A synonym of *M. pustulata.*

M. violacea (violet). A synonym of *M. ensifolia.*

MAST. The fruit of *Fagus sylvatica.*

MASTACANTHUS SINENSIS. A synonym of **Caryopteris Mastacanthus** (which *see*).

MASTWORTS. Lindley's name for *Corylaceæ.*

MATAXA. A synonym of **Lasiospermum** (which *see*).

MATHIOLA (named after Peter Andrew Mathioli, 1500-1577, an Italian physician and celebrated botanist). Stock. ORD. *Cruciferæ.* A genus of about thirty species of hardy, half-hardy, or greenhouse, annual, biennial, or perennial, stellato-tomentose herbs or sub-shrubs, natives of Western and Southern Europe, Western Asia, and (one) South Africa. Flowers often purple, large, racemose, generally sweet-scented; petals with long claws; stigmas connivent, thickened or horned at the back. Seeds thin, flat, numerous; pods large, nearly cylindrical, or compressed. Leaves oblong or linear, entire or sinuate. Mathiolas are well-known plants, largely cultivated in

FIG. 523. MATHIOLA INCANA FLORE-PLENO.

almost every garden, under the popular name of Stocks. There are several sections, and numerous varieties; the flowers represent a great diversity of colour, and are invariably highly perfumed, and of great beauty. Plants may readily be raised from seed, sown in succession on a slight hotbed, from February till April, and the seedlings transplanted, when large enough, to the open ground where they are intended to flower. The Brompton and Intermediate sections should be sown in August and September, and the plants preserved in pots, in a cold frame, throughout the winter, in preparation for flowering early, outside, the following season. Varieties of *Mathiola* are very extensively cultivated in pots, for greenhouse and other decorations. For general culture of all the sections, *see* **Stocks.**

M. annua (annual).* Ten-Weeks Stock. *fl.* of various colours, pure and variegated, varying from single to double. May to October. Pods somewhat cylindrical, without glands. *l.* lanceolate, blunt, hoary. Stem herbaceous, erect, branched. *h.* 1ft. to 2ft. South Europe, 1731. Hardy annual. The Intermediate Stock belongs to this species.

M. bicornis (two-horned).* *fl.* purplish-red, like those of *M. incana*, but smaller, sub-sessile; petals oblong-spathulate. Spring. Pods long, terete, cinereous. *l.* oblong-lanceolate, pinnatifid; upper ones entire. Stem branched. Greece. Half-hardy sub-shrub.

M. fenestralis (fenestrate). *fl.* scarlet or pale purple, a little smaller than those of *M. incana.* July and August. Pods pubescent, without glands, broadest at the base. *l.* crowded, obovate,

Mathiola—*continued.*

downy, revolute. Stem erect, simple. *h.* 1ft. Crete, 1759. Hardy sub-shrub.

M. incana (hoary).* Wallflower-leaved Stock. *fl.* usually purple. Summer and autumn. Pods somewhat compressed, without glands. *l.* lanceolate, hoary. Stem shrubby at the base, erect, simple or branched. *h.* 1ft. to 2ft. South Europe. Half-hardy sub-shrubby biennial. From this species, the Brompton and Queen Stocks have originated, and these are said to be distinguished by the under portion of the leaf of the latter being rough and woolly, whilst the leaf of the former is smooth on both surfaces. *flore-pleno* is a double-flowered form. See Fig. 523.

M. odoratissima (very sweet-scented). *fl.* dirty cream-colour, or when old purplish-brown, sweet-scented in the evening. June and July. Pod compressed, somewhat hoary. *l.* downy or pubescent, toothed or pinnatifid. Stem erect, branched. *h.* 1ft. to 2ft. Persia, 1795. Greenhouse evergreen sub-shrub. (B. M. 1711.

FIG. 524. FLOWERING BRANCH OF MATHIOLA TRICUSPIDATA.

M. tricuspidata (three-pointed). *fl.* bright lilac (lighter-coloured towards the base of each petal), in terminal, flexuose, many-flowered racemes. Summer. *l.*, root ones oblong, obtuse, repandly dentate or slightly sinuate; cauline ones more divided, sinuately pinnatifid. *h.* 1ft. Mediterranean region. Hardy annual. See Fig. 524. (S. B. F. G. 46.)

MATONIA (named after Dr. Maton, Vice-president of the Linnæan Society). ORD. *Filices.* A monotypic genus. The species is a rare and handsome stove fern. For culture, *see* **Ferns.**

FIG. 525. MATRICARIA INODORA FLORE-PLENO, showing Habit and detached Flowering Branchlet.

Matonia—*continued.*

M. pectinata (comb-like). *fronds* ample, fan-shaped, 1½ft. to 2ft. wide, hard-coriaceous, each portion sub-scorpioideo-pinnate on the upper side, pinnules consequently all secund pectinato-pinnatifid. Receptacle of the *sori* expanded into a firm, membranaceous, umbrella-shaped, obscurely six-lobed, stipitate involucre, which covers and incloses six large sessile capsules. Borneo, &c., 1839.

MATRICARIA (so called from its former use in uterine affections). ORD. *Compositæ*. A genus of about seventy species of annual, rarely perennial, branched herbs, natives of Europe, North and South Africa, and West Asia. Flower-heads yellow, with the ray white or absent; involucral bracts in few series, nearly equal; receptacle broad, flat or conical, elongate after flowering, naked. Leaves much-divided, with narrowed lobes. Few of the species are worthy of cultivation; the annuals are readily raised from seeds, and the perennials by divisions of the roots, or by cuttings.

M. inodora flore-pleno (double-flowered, inodorous).* *fl.-heads* white. A double form of a native weed, a very floriferous and pretty border plant. See Fig. 525. In some gardens, it is met with under the name of *Anthemis Chamomilla flore-pleno*.

MATTOCK, or **PLANTER'S MATTOCK**. A garden implement, about the size and shape of an ordinary pick, but differing from that tool in having only one end pointed, the other being flattened in a transverse direction to the handle, like that of a grubbing axe. It is very useful for penetrating and breaking up hard masses of earth, &c.

MAURANDYA (named after Dr. Maurandy, once Professor of Botany at Carthagena). Including *Lophospermum* and *Usteria* (of Cavanilles). ORD. *Scrophularineæ*. A small genus (six species) of greenhouse, glabrous or pubescent herbs, confined to Mexico. Flowers violet, purple, or rose, showy; pedicels axillary, ebracteate; calyx five-parted; corolla tube spurred at base; lip spreading. Leaves alternate, or the lower ones opposite, hastate, angularly lobed or thickly toothed. *M. Barclayana* is

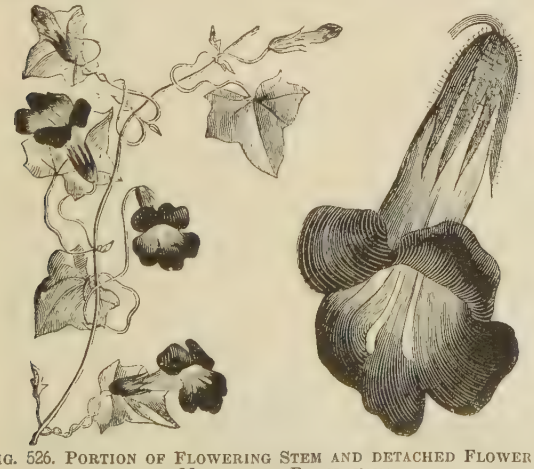


FIG. 526. PORTION OF FLOWERING STEM AND DETACHED FLOWER OF MAURANDYA BARCLAYANA.

one of the best-known species; it should be treated as an annual, for summer flowering outside. *M. erubescens* and *M. scandens* are well suited for a trellis or dwarf wall, outside, in a warm situation. All the species succeed in any moderately rich sandy loam. Propagated by seeds, which should be sown, in early spring, on a slight hotbed, and the seedlings grown on prior to being planted in greenhouses, or warm positions outside, in May or June; also by cuttings of young shoots, inserted, in August, under a shaded hand glass.

M. atrosanguineum (dark bloody). *fl.* dark purple; corolla funnel-shaped, clothed with white glandular hairs; throat cylindrical. Summer. *l.* cordate, acuminated, coarsely and dentately serrated. 1832. Plant clothed with shining, jointed hairs. (B. R. 1755.)

Maurandya—*continued.*

M. Barclayana (Barclay's).* *fl.*, corolla 1½in. to 2in. long; tube downy, greenish, curved; lobes ovate-roundish, emarginate, of a violet-purple colour. Summer. *l.* cordate, acuminated; young ones somewhat hastate; lower and middle ones obscurely five-lobed. 1825. See Fig. 526. (B. R. 1108; L. B. C. 1381.)

M. erubescens (blushing). *fl.* large, rose-coloured, beset with capitate hairs; tube whitish beneath, marbled in various ways inside. Summer and autumn. *l.* cordate, five-lobed, downy; lobes mucronate, crenated, or deeply serrated. Branches clothed with articulated, short, viscid hairs. 1830. (B. v. 242; B. M. 3037, 3033; B. R. 1381, under name of *Lophospermum erubescens*.)

M. Hendersoni (Henderson's). Probably a variety of *M. scandens*.

FIG. 527. FLOWERING BRANCH AND DETACHED FLOWER AND LEAF OF MAURANDYA SCANDENS.

M. scandens (climbing).* *fl.* purplish-violet, glabrous. Summer. *l.* cordate, acuminated, deeply serrated, hairy. 1834. See Fig. 527. SYNS. *Lophospermum scandens* (B. i. 17; B. M. 3650; S. B. F. G. ser. ii. 401) and *Usteria scandens* (A. B. R. 63). *M. Hendersoni*, with violet-purple flowers, striped or spotted with white, is probably a variety of this species.

M. semperflorens (ever-flowering). *fl.*, corolla pale violet or reddish, 1½in. long, with emarginate lobes; tube variously furrowed; filaments rather villous at base; calyx segments lanceolate-subulate, glabrous. *l.* mostly cordate-hastate. 1796. (B. M. 460.)

MAURIA (named after Ernesto Mauri, an Italian botanist, 1791-1836). ORD. *Anacardiaceæ*. A genus comprising ten species of stove evergreen trees, inhabiting tropical America. They have axillary and terminal panicles of hermaphrodite or polygamous flowers, and alternate, simple or impari-pinnate leaves. The two species once cultivated in this country, *M. heterophylla* and *M. simplicifolia*, are probably now lost to British gardens.

MAURITIA (named after Prince Maurice, of Nassau, 1567-1665, a supporter of natural history). Including *Orophoma*. ORD. *Palmæ*. A genus comprising six or seven species of handsome, large-growing, unarmed, stove Palms, natives of Northern Brazil, Guiana, and the West Indies. Flower-spikes pendulous, produced from amongst the leaves, often very large, and bearing the flowers in numerous catkins, which are sheathed at the base. Fruit large, clothed with hard scales, overlapping, like a coat of mail. Leaves in a large crown, fan-shaped. Mauritias thrive best in a compost of loam and peat; and the pots should, if possible, be placed in tanks of water. Propagated by seeds, sown in a hotbed, in spring.

M. aculeata (prickly). *l.* flabelliform-pinnatifid; pinnæ lanceolate-linear, spinulosely ciliated, densely glaucous beneath. Caudex spiny. Tropical America. A curious and handsome species.

M. flexuosa (flexuous). *l.* flabelliform-pinnatifid, dark green on both surfaces; petioles semi-terete, channelled. Caudex unarmed. Tropical America, 1816. A handsome plant.

MAXILLARIA (from *maxillæ*, the jaws of an insect; referring to a resemblance in the column and lip). ORD. *Orchideæ*. An extensive genus of stove terrestrial

Maxillaria—*continued.*

Orchids. Over 100 have been enumerated as species, but some of these are merely garden forms; they are natives of tropical America, extending from Brazil as far as the West Indies and Mexico. Flowers more or less ringent; lateral sepals adhering to the column at their oblique base; lip hooded, jointed with the prolonged claw-like foot of the column, which is narrow, ascending; pollen masses four; scapes or peduncles at base of pseudo-bulbs, or in the axils of the leaves, solitary, always one-flowered. Leaves coriaceous, slender, or rather fleshy. A large number of species and varieties are described, but, as the majority of them produce small flowers, the whole genus has fallen out of favour with most orchid-growers. There are, however, some which should find a place in every collection, however limited the space. From a cultural point of view, few plants of this order are easier to grow than those now under consideration. Maxillarias thrive best when treated as pot plants, and should be potted in a compost of good fibrous peat and chopped sphagnum, in about equal parts. During the growing season, a temperature of 60deg. to 70deg., and an abundant supply of water, are essential to their well-being; in the winter, less water must be given, and the temperature should fall some 10deg. or 12deg. lower than during the period of growth. It is not, however, advisable to thoroughly dry off during winter. Propagated by divisions of the pseudo-bulbs, in spring. Other species formerly included here will now be found under **Xylobium** (which *see*).

M. acicularis (needle-leaved). *fl.* dark blood or chocolate-coloured, erect; sepals and petals oblique or sub-ovate-spathulate; petals paler, and decurrent with the white column; lip obscurely three-lobed. *l.* setaceo-fusiform, 3in. to 4in. long. Pseudo-bulbs in clusters. Brazil. (B. M. 4374.)

M. acutipetala (sharp-petaled). *fl.* pale orange, spotted and blotched with blood-colour; sepals oblong, acute, 1½in. long; petals smaller; lip articulated on the base of the decurrent column, paler below. March and April. *l.* two, from the summit of the pseudo-bulb, linear-oblong or almost ligulate. Pseudo-bulbs deeply furrowed. Central America. A very desirable orchid. (B. M. 3966.)

M. arachnites (cobwebby). *fl.* yellowish; acuminate segments bent and twisted; lip ochre, bordered with purple, and with many short streaks and lines. Columbia, 1880.

M. aromatica (aromatic). A synonym of *Lycaste aromatica.*

M. ciliata (ciliate). A synonym of *Lycaste Barringtoniæ.*

M. cruenta (bloody). A synonym of *Lycaste cruenta.*

M. cucullata (hooded). *fl.* greenish-chocolate; sepals oblong-lanceolate, acute, spreading; petals similar, but smaller, connivent over the column; lip jointed at the base of the column, recurved; scapes radical, about 4in. long. September. *l.* solitary, linear-oblong. Pseudo-bulbs surrounded by jagged membranes. Tropical America. (B. M. 3945.)

FIG. 528. FLOWER OF MAXILLARIA PICTA.

M. Deppei (Deppe's). A synonym of *Lycaste Deppei.*

M. fractiflexa (twisted). *fl.*, sepals and petals drawn out into long curved and twisted tails, 6in. or more in length, the tails and basal parts purple; disk white; lip white and red. 1881. A distinct species.

Maxillaria—*continued.*

M. grandiflora (large-flowered).* *fl.* large; sepals snow-white, from 1½in. to 2in. long, and from ¾in. to 1in. broad, not acuminate; petals snow-white, smaller; lip three-lobed, streaked with yellow on the lateral lobes, and blotched with crimson inside, central or intermediate portion lemon-yellow; scape one-flowered; 4in. to 9in. high. Pseudo-bulbs ovate, with sharp edges, dark green, 2in. high, and one-leaved. Paraguayan Andes and Peru. (I. H. 14.)

FIG. 529. PSEUDO-BULB, LEAF, AND FLOWER OF MAXILLARIA VENUSTA.

M. Henchmanni (Henchmann's). A synonym of *M. variabilis.*

M. irrorata (bedewed). *fl.* white, bordered, blotched, and washed with purple, about 1in. long; lip ochre, with a purple margin and two purple spots beneath; peduncle covered with broad sheaths. Andes, 1883.

M. leptosepala (narrow-sepaled). *fl.* large, solitary; sepals yellowish-white, very spreading, 2½in. long; petals similar, but smaller; lip oblong-obovate, three-lobed, with a swelling at the base of the disk; scapes two or three from the base of the pseudo-bulbs. July. *l.* solitary, nearly 1ft. long. Pseudo-bulbs clustered, about 2in. long. *h.* 1ft. New Grenada, 1846. (B. M. 4434.)

M. luteo-alba (yellowish-white).* *fl.* creamy-white, large, proceeding from the sides of the bulbs at different times of the year. *l.* long and broad, about 1½ft. in height. Merida. A neat-growing species. (W. O. A. 106.)

M. luteo-grandiflora (large-flowered yellow).* *fl.*, sepals and petals broad, creamy-white towards the base, of a tawny-orange upwards, suffused with brownish-crimson; lip creamy-white; scapes about half the length of the leaves. Winter and spring. A very handsome garden plant, forming a compact mass, and flowering very freely. (F. M. 559.)

Maxillaria —*continued.*

M. nigrescens (dark). *fl.*, sepals and petals port-wine colour, spreading; lip of the same colour, stained with dull purple; peduncles erect. Winter and spring. Pseudo-bulbs light green, bearing a solitary, dark green, coriaceous leaf. New Grenada.

M. Parkeri (Parker's). *fl.* buff, white; sepals oblong, obtuse; petals linear-lanceolate; lip trilobed, hooded. April. *l.* lanceolate, coriaceous, obscurely striate. Pseudo-bulbs oval, compressed, one-leaved. *h.* 9in. Demerara, 1826. (B. M. 2729.)

M. picta (painted). *fl.* of a soft cream-colour, more or less streaked and dotted with dull purple and chocolate, both within and without, yielding a most powerful aromatic perfume; petals remarkably incurved; scapes from 5in. to 6in. high. Winter. *l.* thick, strap-shaped, nearly 1ft. long. Brazil. Not a very showy species, but a profuse blossomer, and admirably suited for growing in a Wardian case. See Fig. 528. (B. M. 3154.)

M. porphyrostele (purple-columned). *fl.* whitish-yellow; petals with a purplish streak at the base; lip with purplish veins on the side lobes. Spring. *l.* linear-ligulate, from small ovoid pseudo-bulbs. *h.* 6in. Brazil, 1873. This species somewhat resembles *M. picta*. (B. M. 6477.)

M. rufescens (reddish). *fl.* orange and yellow, spotted with dark purple-red, sweet-scented. Trinidad, 1836. (B. R. 1848.)

M. splendens (splendid).* *fl.*, sepals and petals white; lip orange, margined with rose. Columbia, 1870. A very handsome species, similar in growth to *M. venusta*, but more robust.

M. tenuifolia (slender-leaved). *fl.* yellow, with bright crimson barrings, proceeding from the base of the matured growths. March. *l.* long-linear, acuminate. Pseudo-bulbs ovate, like so many bulbils strung together on short perpendicular footstalks. (B. R. xxv. 8.)

M. tetragona (tetragonal). A synonym of *Lycaste tetragona*.

M. Turneri (Turner's). *fl.* of a rich cinnamon-brown and crimson, with a delicious fragrance. May. *l.* long, broad, 1ft. high. Pseudo-bulbs short. A distinct and desirable plant.

M. variabilis (variable).* *fl.* purplish; sepals and petals erect, oblong-acute; lip oblong, erect, obscurely three-lobed; peduncles longer than the pseudo-bulbs. *l.* solitary, linear-ligulate. Mexico. (B. M. 3614, under name of *M. Henchmanni*.)

M. venusta (handsome).* *fl.* of a very beautiful waxy-white, thick and fleshy in texture; lip faintly stained with yellow and blotched with crimson; scapes long. November to February. *l.* light shining green, linear-oblong. Pseudo-bulbs two-leaved. New Grenada, 1862. A beautiful species, very easy to grow, and remaining in flower a long time. See Fig. 529. (B. M. 5296.)

MAXIMILIANA (named after Maximilian I., King of Bavaria). ORD. *Palmæ*. A small genus (three species) of elegant stove Palms, inhabiting the Amazons and Maranon, and the island of St. Kitts and Trinidad. Flower-spikes each inclosed in a thick woody spathe, which tapers to a long point, deeply furrowed, splitting open at last down one side. Leaves very large, pinnate, borne at the summit of the trunks; leaflets narrow, arranged in clusters along the stalks. Trunks slender, smooth. This genus is closely allied to **Cocos** (which *see* for culture).

M. caribea (Caribbean). *l.* large; segments pale green, reduplicate, obliquely inserted at the double base, densely veiny with transverse veins. This species is similar in habit to *M. Martiana*, but the leaf segments are broader, and a little tapering towards the eroded point. St. Kitts.

M. Martiana (Martius'). *l.* pinnate; leaflets linear, acuminate, pendent, dark green, about 2ft. long. Caudex erect, cylindrical, unarmed. South America, 1825. A handsome decorative plant when in a young state. SYN. *M. regia*.

M. regia (royal). A synonym of *M. Martiana*.

MAXIMOWICZIA. Included under **Schizandra** (which *see*).

MAY. A name applied to the blossoms of *Cratægus Oxyacantha*.

MAYACEÆ. A natural order, comprising a solitary genus, *Mayaca*, of Moss-like, slender, creeping, pellucid plants, all natives of America, allied to *Commelinaceæ* and *Xyridaceæ*, but readily distinguished by their one-celled anthers. Flowers white, pink, or violet, axillary, solitary, peduncled. Leaves all alternate, crowded, linear, emarginate, flaccid. There are about seven species.

MAY APPLE. *See* **Podophyllum peltatum** and **Passiflora incarnata.**

MAY BUGS. A name sometimes given to certain beetles which are destructive, in the larval form, to the roots of numerous plants, including many that are cultivated in fields and in gardens. The perfect insects also are very destructive, often stripping the leaves almost entirely from trees, especially from Oaks, low fruit-trees, and Rose bushes.

The most successful methods for limiting the number of these insects are, hand-picking, or shaking them off the shrubs or bushes into vessels in the very early morning, or collecting the grubs, when these are exposed by digging or ploughing the soil. In either case, the insects found should be at once destroyed. Birds also render good assistance in this direction by the number that they eat, either as beetles or as larvæ. Among the birds most useful in this way, starlings and rooks deserve special mention. Other remedies will be found under **Cockchafer** and **Insecticides** (which *see*). There are several kinds of beetles indigenous to England included under the name of May Bugs; of these, the more

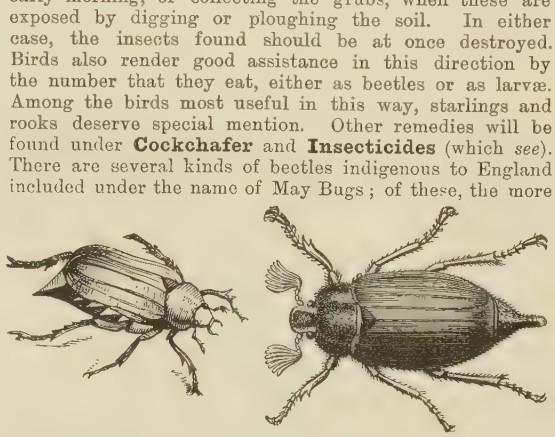


FIG. 530. MELOLONTHA VULGARIS (Cockchafer), Female and Male.

important are the Cockchafer (*Melolontha vulgaris*, see Fig. 530) and the Lesser May Bug (*Phyllopertha horticola*).

The Cockchafer has been already noticed in this work. It is very abundant in the South of England, but becomes local and scarce in Scotland. It may be added here, that, in the Cockchafer, the wing-cases and legs are yellowish-brown, with a dash of red, but are covered with short, fine, grey hairs, which are very readily rubbed off. The rest of the upper surface is mostly pitch-black, with paler pubescence. The antennæ, or feelers, are rusty-red. The lower surface of the body is black, with paler pubescence, and five conspicuous white triangular spots on the sides of the segments of the abdomen.

The Lesser May Bug is nearly as abundant as its larger ally in the South of Britain, and in the North is far more common than that insect. It is much smaller, being only ⅓in. to ⅔in. long, and the club of the antennæ is composed of only three, instead of six or seven, flattened joints. In colour of wing-cases, and in form, it is much like the Cockchafer, but the tip of the body is not prolonged as in that species. Occasionally, the wing-cases are brown or green-black. The rest of the body is shining green or blue-black, with long, erect, paler hairs on certain parts. The beetles at times do considerable damage to Roses and to fruit-trees, by feeding on the stamens and petals of the flowers. They may, however, in dull weather, be successfully shaken off the bushes into an inverted umbrella, and should be collected and destroyed when so numerous as to become troublesome. The larvæ resemble those of the Cockchafer, except in size. They feed on the roots of many garden plants, and also on those of the Fir; and they are often present in flower-pots, the plants in which they frequently destroy, causing them to fade early. At times, they are very troublesome. The methods recommended for the destruction of the larvæ of the Cockchafer will be found useful against this species also. If a pot plant becomes sickly without visible cause, it should be turned out, with the earth attached to the roots, and there will then often be found one or more of the larvæ of the Lesser May Bug feeding on it.

MAYFLOWER. A New England name for **Epigæa repens** (which *see*).

MAYTENUS (from *Mayten*, the Chilian name of the genus). SYN. *Hœnkea.* ORD. *Celastrineæ.* A genus comprising about fifty species of unarmed, greenhouse or half-hardy, evergreen shrubs or small trees, natives of the tropical, sub-tropical, and temperate Southern regions of America. Flowers white, yellow, or reddish, small, axillary, solitary or fasciculate, or cymose. Capsule coriaceous, one to three-celled. Leaves alternate, often distichous, petiolate, coriaceous, serrated. The wood of the arborescent species is extremely hard, and the leaves of the Peruvian kinds are much liked by cattle. The species are not largely grown in this country. For culture, *see* **Celastrus.**

M. Boaria (Boaria). *fl.* white, scattered. *l.* opposite or alternate, oblong, smooth, serrated. *h.* 10ft. Chili, 1822. Greenhouse shrub.

M. chilensis (Chilian). *fl.* greenish-yellow. May. *l.* elliptic-oblong, tapering to the base, taper-pointed, with serrated edges. Chili, 1829. Half-hardy tree or shrub. (B. R. 1702.)

MAZUS (from *mazos*, a teat; tubercles closing the mouth of corolla). SYN. *Hornemannia.* ORD. *Scrophularineæ.* A small genus (four species) of low, hairy or glabrous, herbaceous plants, inhabiting India, Eastern Asia, the Malayan Archipelago, and Australia. Corollas pale bluish or white; pedicels alternate; racemes terminal, sub-secund. Lower leaves and those of the young shoots opposite, those of the floral branches commonly alternate, inciso-crenate or thickly toothed. The undermentioned species is the best. It is an interesting, distinct, and pretty perennial, with a vigorous habit, rapidly forming dense tufts, scarcely 3in. in height. It thrives in pots or cold frames, or in the open air, and is best placed in firm, open, bare spots on rockwork, in free, sandy soil, in warm positions. Propagated by divisions.

M. pumilio (dwarf).* *fl.* pale violet, borne on very short stems. Early summer. *l.* spathulate, slightly waved at the edges. Australia, &c., 1823.

MEADIA. A synonym of **Dodecatheon** (which *see*).

MEADOW PINK. A common name of *Dianthus deltoides.*

MEADOW RUE. *See* **Thalictrum.**

MEADOW SAFFRON. *See* **Colchicum.**

MEADOW SWEET. *See* **Spiræa Ulmaria.**

MEALY BUG (*Coccus adonidum*). This well-known insect pest to cultivated plants belongs to the order *Homoptera*, and is very nearly allied to the equally hurtful Scale insects, and the Aphides, or Greenflies. From the latter class it differs in its broader and more flattened form, in having two filaments at the end of the abdomen, in never having honey-tubes, and in the males having only two wings. Scale and Mealy Bug are really group names, that include several kinds under each; and, together, they form the family *Coccidæ*, the males of which are minute, and of the structure described above, having no beak with which to feed. The females are usually very much larger than the males, are wingless, and have a beak. In the Scale insects, the female, after a time, becomes quite inert, and dies, attached to some branch, and covered over with a shield-like coat on the back. In the Mealy Bug, the female remains able to move during life; and her body is covered, not with a shield-like skin, but with cottony tufts of a white substance, the rings of the body remaining quite distinct when the coating is removed. The substance is secreted in the form of a sticky fluid, which, on the death of the insect, assumes the cottony appearance. With this substance the female covers up her eggs.

A number of kinds of *Coccus* have been described; but the commonest and most injurious in glass houses is *C. adonidum.* This insect attacks almost all greenhouse and stove plants, Vines, &c., but is partial to *Dracæna* and its allies, asclepiads, and the members of certain other orders. The male is small, of a pale red colour, covered with a white bloom. It has white wings, the front margin of which is spotted with red; the tail filaments are white, and the antennæ moderately long. The female is oblong, wingless, red, but covered with white powder, and has the antennæ shorter than in the male. She can move freely till the time of laying her eggs has arrived, when her body remains, as a shield for her eggs, under the cottony substance previously referred to.

Mealy Bug—*continued.*

Numerous remedies against Mealy Bug have been proposed. Probably, the best are washing and scrubbing the branches and diseased leaves with a wash containing soft soap or infusion of tobacco. Spirits of wine (35 p.c.), applied with a small brush, is said to destroy the insects without injuring the plants. Gishurst's Compound, oils, and Vine dressings, have also been recommended as applications to woody parts, such as branches. All of these are useful insecticides, but are liable to injure the green parts of plants. Smoking, as practised for Aphides, does not materially injure the Mealy Bug's eggs, so that it should be repeated in a few days. Where a greenhouse is much infested, it should be thoroughly cleaned out, and all but the more choice plants should be destroyed. *See also* **Insecticides.**

MEASURES. As Measures in use for the sale of garden produce vary so much in different parts of the country, it will be impracticable to refer to them all here in a few general remarks. Baskets for fruit and vegetables are of various sizes and shapes, according to the several purposes for which they are required. The appended list includes most of the different Measures in use for the London markets. Being frequently made of very thin deal strips, which are more or less flexible, they vary a little in size. Especially is this the case with punnets, so largely used in London for holding nearly all kinds of fruit and salading, in small quantities, for sale. Grapes are put up in 2lb. and 4lb. punnets; new potatoes in 2lb. punnets. Apples and pears are put up in bushels, sieves, or half-sieves. Weights are always 16oz. to the pound.

Bunch. This term is used in speaking of herbs, &c. The size varies according to the season. A bunch of turnips consists of twenty to twenty-five; of carrots, thirty-six to forty; of greens, as many as can be tied together by the roots.

Bundle. A bundle of broccoli, celery, &c., contains six to twenty heads; seakale, twelve to eighteen heads; rhubarb, twenty to thirty stems, according to size; and of asparagus, from 100 to 125.

Bushel Basket. When heaped, a bushel basket ought to contain 1 imperial bushel. Diameter at bottom, 10in.; at top, 14½in.; depth, 17in. Walnuts, nuts, apples, and potatoes are sold by this measure. A bushel of the last-named, cleansed, weighs 56lb., but 4lb. additional is allowed if they are not washed. A junk contains two-thirds of a bushel.

Bushel Sieve. There are 10½ imperial gallons to a bushel sieve. Diameter at top, 17¾in.; at bottom, 17in.; depth, 11¼in.

Hand. A bunch of radishes, which contains from twelve to thirty, or more, according to the season.

Mushroom Punnets. These measure 7in. by 1in.

Pottle. A long, tapering basket, that holds rather over 1½ pints. A pottle of strawberries should hold ½ gallon, but never holds more than 1 quart. A pottle of mushrooms should weigh 1lb. A pottle of potatoes, = ¼ peck, should weigh 3½lb.

Radish Punnets. If to hold six hands, 8in. diameter by 1in. deep; or for twelve hands, 9in. by 1in.

Salading Punnets. The size of these is 5in. by 2in.

Seakale Punnets. Diameter at the top, 8in.; at the bottom, 7½in. depth, 2in.

Sieve. This contains 7 imperial gallons. Diameter, 15in.; depth, 8in. A sieve of peas is equal to 1 bushel; a sieve of currants, 20 quarts. A half-sieve contains 3½ imperial gallons. It averages 12½in. in diameter, and 6in. in depth.

Land Measures. In measuring the surface of land of considerable extent, what is known as Gunter's Chain is commonly employed by surveyors. It consists of 100 links, each measuring 7·92in. in length. The total length is, therefore, 66ft. = 22yds. = 4 poles. This Measure is

Measures—*continued.*

indispensable for ascertaining the area of large spaces or the length of walks, roads, &c. Measuring-rods are always useful in gardens, for fixing the necessary distances, when planting various crops. Without measurements of some sort, no regularity in cropping could be insured. A 10ft. rod is a handy length. It should be 1¼in. square, and be marked every 3in. on two opposite surfaces, the numbers of the feet reading from either end.

MECONOPSIS (from *Mekon*, a Poppy, and *opsis*, resemblance; alluding to the general appearance of the plant). Ord. *Papaveraceæ*. A genus comprising eight species of showy, hardy, perennial, biennial, or rarely annual herbs, of which one is found in Western Europe (Britain), one in North-west America, and the rest in the Himalayas. Flowers yellow, purple, or blue, large, showy, on long peduncles, nodding when in the bud; petals four; sepals two. Leaves entire, or often lobed or dissected. The species are of easy culture in any moderately good garden soil. Seeds of the Indian species should be sown, during March, in a gentle hotbed, and the seedlings transferred, when large enough to handle, to the open border.

M. aculeata (prickly). *fl.* purple, with numerous yellow stamens, about 2in. across. *l.* cordate in outline, somewhat five-lobed, covered with rigid, hair-like prickles. *h.* 2ft. North-west India, 1864. Biennial. (B. M. 5456.)

M. cambrica (Welsh).* Welsh Poppy. *fl.* pale yellow, erect, on long peduncles. May to August. *l.* numerous on the lower part of the stem, pinnate, stalked; lobes toothed, somewhat decurrent. *h.* 1ft. Western Europe (Britain). A very showy and desirable perennial; it thrives well on rockwork. (Sy. En. B. 63.)

M. nepalensis (Nepaulese).* *fl.* pale golden-yellow, nodding, from 2in. to 3½in. across. Flower stems from 3ft. to 5ft. high, not much branched. Himalayas, 1865. A handsome free-flowering biennial. (B. M. 5585.)

M. simplicifolia (simple-leaved). *fl.* violet-purple, solitary and terminal, from 2in. to 3in. across. June. *l.* tufted, lanceolate, slightly toothed, covered with a short, dense, brownish pubescence. *h.* 3ft. Nepaul, 1855. Biennial. (I. H. 114.)

M. Wallichi (Wallich's).* *fl.* pale blue, drooping on the slender branches, somewhat evanescent. June. *l.* pinnatifid, hispid, sometimes 1ft. long. *h.* 4ft. to 6ft. Sikkim Himalayas. A very handsome biennial. (B. M. 4668.)

M. W. fusco-purpurea (brownish-purple). A very effective and ornamental variety, having brownish-purple flowers arranged in a loose panicle, 2in. to 3in. in diameter. (B. M. 6760.)

MECOSORUS. Included under *Gleichenia*.

MEDEOLA (name of mythological origin, after the sorceress Medea; from the wholly imaginary notion that the species possesses great medicinal virtues). Syn. *Gyromia*. Ord. *Liliaceæ*. A monotypic genus. The species is a hardy herbaceous plant, with a white rhizome, tasting like Cucumber. It thrives best in a rich sandy soil. Propagated by dividing the plant, in spring.

M. asparagoides. *See* **Myrsiphyllum asparagoides.**

M. virginiana (Virginian). *fl.* yellow or greenish-yellow, in a sessile umbel. June. *l.* whorled, obovate-lanceolate, sessile. Stem erect, simple. *h.* 9in. Virginia, 1759. (B. M. 1316.)

MEDICAGO (from *Medike*, a name given by Dioscorides to a Median grass). Lucern; Medick. Ord. *Leguminosæ*. A large genus (above forty species have been described) of hardy herbs, or rarely shrubs, of scarcely any horticultural value. Flowers yellow or violet; peduncles axillary, one, two, or many-flowered. Leaves trifoliolate, stalked; leaflets usually toothed. The only species worth cultivating is *M. falcata*, which is suitable for banks or slopes, borders, and rough rockwork of all sorts. It thrives in any ordinary soil. Propagated by divisions, or by seeds. The value of *M. sativa* is wholly agricultural; and, from its great importance in that sphere, it could not be omitted from this work.

M. arborea (tree-like). *fl.* yellow, in umbellate racemes. May to November. Pods lunate, entire at edge. *l.*, leaflets obovate, light green. Stem arborescent. *h.* 2ft. to 8ft. South Europe, 1596. (L. B. C. 1379.)

Medicago—*continued.*

M. falcata (sickle-shaped). *fl.* usually pale yellow, but occasionally violet and green, in short, close, axillary racemes, on stalks longer than the leaves. Summer. *l.*, leaflets oblong, toothed at the apex, entire at base. Stems 2ft. to 4ft. long, prostrate. Europe (Britain), North Asia, and India. A hardy herbaceous perennial. (Sy. En. B. 336.)

M. marina (sea-loving). *fl.* yellow; peduncles many-flowered. June to August. Pods cochleate, roundish, muricate. *l.*, leaflets downy, obovate, entire. *h.* 1ft. South Europe, 1596. (S. F. G. 770.)

M. sativa (cultivated). Purple Medick or Lucern. *fl.* violet, large, on racemose peduncles. Summer. *l.*, leaflets obovate-oblong, toothed, mucronate. Stems erect, glabrous. *h.* 2ft. Mediterranean region (naturalised in Britain). Hardy herbaceous perennial. (Sy. En. B. 334.)

MEDICIA. A synonym of **Gelsemium** (which *see*).

MEDICK. *See* **Medicago.**

MEDINILLA (named after J. de Medinilla, of Pineda, Governor of the Marianne Islands). Ord. *Melastomaceæ*. A genus comprising about fifty species of erect or scandent, stove, evergreen, branched shrubs, natives of the East Indies, Ceylon, the Malayan and Pacific Islands, rare in the West African and Mascarene Islands. Flowers

Fig. 531. Flowering Branch of Medinilla magnifica.

white or rose, bracteate or ebracteate, disposed in panicles, or in lateral, many or few-flowered cymes; bracts sometimes large, rosy; calyx entire, or four to six-toothed; petals four or five (rarely six), ovate, oblong, or obovate, acute. Berry globose or ovoid. Leaves opposite or verticillate, rarely very unequal, or solitary and alternate,

Medinilla—*continued.*

entire, fleshy, three to nine-nerved; nerves sometimes pinnate. The species do best in a compost of peat, thoroughly decomposed leaf mould, and light loam, in equal parts, with about a sixth part of silver sand added. Medinillas luxuriate in a moist atmosphere and a high temperature. All those described below are branched, more or less erect, shrubs, not climbers.

M. amabilis (lovely).* *fl.* rosy-pink, in large panicles, which are erect, and composed of four-branched whorls, the branches each forming a cyme of numerous flowers. Spring. *l.* opposite, sessile, oblong-obovate, obtuse, with a short acuminate point, 1ft. long, 7in. to 8in. broad. Stem quadrangular; angles furnished with a narrow undulated wing. India, 1874. (B. M. 6681; G. C. n. s., xvii. 561.)

M. Curtisii (Curtis').* *fl.* white, in terminal panicles; peduncles and pedicels coral-red; stamens purple. *l.* opposite, elliptic, acute, rather fleshy, three-nerved. Sumatra, 1884. (B. M. 6730.)

M. javanensis (Java). *fl.* of a pale flesh-colour, nearly 1in. across, with very dark purple anthers, disposed in short terminal panicles. Winter. *l.* opposite, sessile, somewhat cordate, elliptic, rather acuminated. *h.* 4ft. Java, 1850. (B. M. 4569.)

M. magnifica (magnificent).* *fl.* rosy-pink, borne in very large, terminal, pendulous racemes, continuing a long time in perfection. May. *l.* opposite, broadly ovate, smooth, rich shining green, 8in. to 10in. long. *h.* 3ft. Manilla. A lovely plant. See Fig. 531. (B. M. 4533.)

M. Sieboldiana (Siebold's). *fl.* white, about ⅜in. across, disposed in a thyrsoid drooping panicle; stamens purple. Winter *l.* oblong, tapering to each end, fleshy. *h.* 4ft. Moluccas. (B. M. 4650.)

M. speciosa (showy). *fl.* crimson, in large, drooping, panicled racemes. July. *l.* almost sessile, four in a whorl, rarely opposite, ovate-oblong. *h.* 2ft. to 3ft. Java, 1845. (B. M. 4321.)

MEDLAR (*Mespilus germanica.*) The wild Medlar, from which the cultivated varieties have originated, is a common deciduous shrub, or small tree, found in hedges and woods throughout a great part of the European continent. It has been found in some parts of England; but whether the plants were, in all cases, truly wild, or had become naturalised, is somewhat uncertain. Under cultivation, the varieties of Medlar differ in habit, the majority being characterised by a spreading, crooked growth, many of the branches assuming an elbowed form, by turning at right angles in various directions. The fruits are produced on the points of main or side shoots. They are hard and useless until beginning to decay, when the green colouring matter passes away, the flesh or pulp becoming soft, and acquiring what is considered by some an agreeably acid flavour. In this incipient state of decay (the process of which is called *bletting*), the fruits are generally eaten raw, but sometimes they are preserved with sugar.

Propagation. The general method of propagation adopted for Medlars is that of budding or grafting. Seedling plants may also be raised, if desired, with a view to obtaining new varieties or stocks. The seeds should be sown so soon as the fruit is ripe. Two years usually elapse before they vegetate, and the young plants must be tied and kept in an upright position, to preserve tolerably straight stems. Besides the Medlar itself, the Pear, Quince, and Whitethorn may also be used as stocks whereon to bud or graft the cultivated varieties. The Pear stock is well adapted for grafting standard high, and succeeds well on ordinary soils; the Quince roots near the surface, and is suited, in consequence, for moist situations; while the White Hawthorn is readily obtained in quantity, is preferred as a stock on the Continent, and is, perhaps, best for light soils and comparatively dry situations. Cleft-grafting in April, with scions of the previous summer's growth, having the extremities removed, and shield-budding, with well-formed dormant buds, in July, are the two methods of propagation usually pursued. The heading-down, or disbudding, of the stock must be attended to so soon as a union is effected between it and the bud or graft, and the latter will require to be kept well staked. *See also* **Budding** and **Grafting.**

Medlar—*continued.*

General Cultivation. Medlars are not very particular regarding soil; but they generally succeed best in somewhat sheltered positions, where the soil is loamy, and inclined to be moist rather than dry. The trees are usually trained as standards, and require but little pruning, beyond thinning out weak growths, to admit light and air to the stronger ones, and to prevent the branches crossing each other. The large Dutch Medlar, which is very extensively cultivated, assumes a naturally crooked and rustic growth; while the small-fruited Nottingham variety is distinct in being of better quality, and of an upright habit. The fruit from Medlars should not be gathered until about the end of October, or even later, if frosts are not prevalent. It should be collected on a dry day, and laid out thinly on a cool fruit-room shelf. A fungus frequently attacks the stems, and passes to other parts, of the fruit, thus rendering it useless. This must be looked for occasionally, and any specimens that are found affected should be at once removed. The process of *bletting* usually takes from two to three weeks at the least, and some fruits may keep good for several weeks afterwards.

Varieties. The following are the best sorts of Medlar in cultivation:

Dutch. Fruit very large, and much flattened, sometimes 2in. in diameter; eye wide open; flavour good, but inferior to the Nottingham. The most extensively cultivated variety, on account of its size. SYNS. Broad-leaved Dutch, Large Dutch, &c.

Nottingham. Fruit smaller than the preceding, about 1in. in diameter, of a rich sub-acid flavour, superior to any other variety. The leaves are small, and the tree of upright-growing habit. SYN. Small-fruited.

Stoneless. Fruit small, from ½in. to ¾in. in diameter. The fruits are destitute of stones, and are only valuable on account of their keeping longer than those of the varieties above named; the quality is not so good.

MEDLAR, JAPANESE. *See* **Photinia japonica.**

MEDORA. A synonym of **Smilacina** (which *see*).

MEDULLARY SYSTEM. "The cellular tissue of the ring, disk, and bands, constitutes the Medullary System. The Medullary System of the disk is called the pith, that of the ring is the cortical pith, and the radiating cellular bands are the Medullary Rays" (Hooker).

MEGACARPÆA (from *megas*, great, and *karpos*, a fruit; in allusion to the large pods). ORD. *Cruciferæ.* A genus consisting of only three species of large, robust, branched herbs, with thick perennial roots, natives of Siberia, the Himalayas, and Thibet. Flowers white or violet, racemose or corymbose; sepals equal at base; stamens six or many, free, edentulate. Pods large, indehiscent, laterally much compressed. Leaves glaucous, pinnatisect. The undermentioned species thrives in light sandy soil, and is increased readily by seeds. *M. polyandra*, a Himalayan species, is, perhaps, not now in cultivation.

M. laciniata (jagged). *fl.* yellow, small; stamens six; valves ovate, broadly winged. June and July. *l.* villous; radical ones stalked, pinnate-parted, with deeply toothed or cut lobes. Stems furnished at the neck with the vestiges of the petioles of the preceding year. *h.* 6in. to 12in. Caspian Desert, &c., 1818.

MEGACARPHA. A synonym of **Oxyanthus** (which *see*).

MEGACLINIUM (from *megas*, large, and *kline*, a bed; referring to the axis or rachis on which the flowers are borne). ORD. *Orchideæ.* A genus comprising about nine species of stove epiphytal Orchids, natives of tropical and Southern sub-tropical Africa. They are closely allied to *Bulbophyllum.* The species are more curious than beautiful. The singular flattened scape is a good distinguishing mark of this genus. For culture, *see* **Bulbophyllum.**

M. bufo (toad). *fl.* brown, purple, covered with black hairs; sepals acute, upper one smooth, lateral ones downy inside; petals small, acute, glabrous; lip ovate, fleshy, wrinkled. March to June. Sierra Leone, 1839. (G. C. 1841, p. 348.)

Megaclinium—*continued.*

M. falcatum (falcate). *fl.* yellow, red; upper segments of perianth obtuse, callous on both sides at apex; outer lateral ones reflexed, bidentate; inner ones or petals smaller, subulate, obtuse. *l.* oval, emarginate, biplicate. Pseudo-bulbs tufted, rather tetragonal, two-leaved. Sierra Leone, 1822. (B. R. 989.)

M. maximum (largest). *fl.* yellow, spotted blood-colour, sessile, appearing like little tadpoles, borne in a line on the middle, on each side of the broad, flat, sword-shaped, green rachis (scape), which arises from the base of the pseudo-bulbs, and is longer than the leaves. June and July. *l.* two or three, ligulate. Pseudo-bulbs oblong, angled. Sierra Leone. (B. M. 4028; B. R. 1959.)

M. purpuratum (purple). *fl.* yellowish, speckled and streaked with purple; rachis 4in. to 6in. long, 1in. broad, pale yellow-green, sprinkled with red-purple. *l.* linear-oblong, in pairs at the top of the pseudo-bulb, obtuse, keeled. Western tropical Africa, 1871. (B. M. 5936.)

MEGARRHIZA (from *megas*, large, and *rhiza*, root; alluding to the large tuberous rootstock). ORD. *Cucurbitaceæ*. A curious and interesting, rather than handsome, hardy tuberous perennial, now included under *Echinocystis*. The plant thrives in a good light soil. Propagated by sowing seeds, in a gentle heat, in spring. This species is peculiar in the thick fleshy cotyledons of the large, turgid, emarginate seeds remaining under the ground in germination.

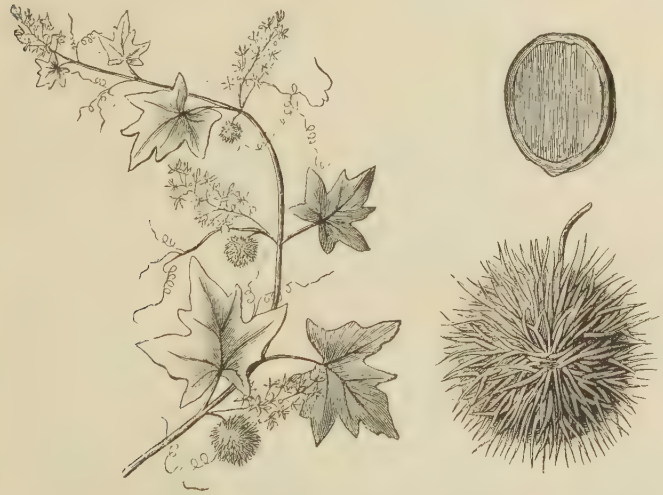


FIG. 532. MEGARRHIZA CALIFORNICA, showing Flowering Stem with the Racemose Male Flowers and the Solitary Fertile Ones from the same Axils; detached Fruit; and Section of Seed.

M. californica (Californian). *fl.*, males small, racemose; females solitary, produced on stalks at the base of the raceme of the males. *fr.* roundish or oblong, about 2in. in length, densely covered with spines, and very closely resembling a sweet chestnut. *l.* glossy, silvery, palmately lobed. California, 1880. See Fig. 532.

MEGASEA. Included under **Saxifraga** (which *see*).

MEIRACYLIUM (from *meirakyllion*, a small boy; probably in reference to the size of the plants). ORD. *Orchideæ*. A small genus of stove epiphytal Orchids, natives of Mexico and Central America. Flowers small, pedicellate; peduncles one or two-flowered; sepals erecto-patent, sub-equal; petals similar; lip continuous with the base of the short, thickish column. Leaves short, broad, sessile, thickly fleshy. The undermentioned species is a very pretty and interesting little orchid. It should be grown on a block of wood. For general culture, *see* **Pleurothallis.**

M. gemma (gem). *fl.* amethyst-coloured, solitary, few, shortly pedicellate. *l.* sessile, broad-cordate. Stems very short, from a creeping rhizome. Mexico.

MELALEUCA (from *melas*, black, and *leukos*, white; the trunk is black, and the branches are white). ORD. *Myrtaceæ*. A genus comprising about 100 species of

Melaleuca—*continued.*

mostly greenhouse evergreen shrubs or trees, all natives of Australia, but one, *M. leucadendron*, also widely distributed throughout tropical Asia. Flowers red, white, or yellow, closely sessile and solitary within each bract or floral leaf, in heads or spikes, or rarely solitary and scattered; calyx lobes five, imbricated or open; petals five, orbicular, spreading. Leaves alternate, or in a few species opposite, entire, usually coriaceous, flat, concave, or semi-terete. The species thrive in a compost of peat and sandy loam. Propagated, in May, by cuttings, about 3in. in length, getting firm at the base, placed in a compost similar to that just named. The shoots must be freely topped while young, to induce a bushy growth.

M. armillaris (bracelet). *fl.* white; spikes cylindrical, quite glabrous. June. *l.* alternate, linear-subulate, mucronate, recurved at the apex. *h.* 6ft. to 8ft. 1788. Shrub. (A. B. R. 175, under name of *M. ericæfolia*.)

M. coronata (crowned). A synonym of *M. thymifolia*.

M. decussata (decussate). *fl.* lilac, rather small, either in oblong or globular lateral heads and spikes and barren, or in oblong or cylindrical interrupted spikes and fertile. August. *l.* mostly opposite, oblong-lanceolate to almost linear, or very rarely broad, obtuse or acute. *h.* 20ft. 1803. A glabrous shrub. (B. M. 2268; L. B. C. 1203.)

M. diosmifolia (Diosma-leaved). *fl.* greenish-yellow; spikes oblong, glabrous. June. *l.* alternate, oval or lanceolate, petiolate, flat, crowded. *h.* 3ft. to 10ft. 1794. Shrub. (A. B. R. 476.)

M. ericæfolia (Erica-leaved), of Andrews. A synonym of *M. armillaris*.

M. ericifolia (Erica-leaved). *fl.* pale yellow; spikes oval, glabrous. July to September. *l.* scattered, narrow-linear, spreading or somewhat recurved. 1788. Shrub or tree. (S. E. B. 34.)

M. Fraseri (Fraser's). A synonym of *M. striata*.

M. fulgens (glittering). *fl.* scarlet, as long as, or longer than, those of other species; spikes oval, quite glabrous. July to September. *l.* opposite, lanceolate-linear, acute. *h.* 6ft. to 20ft. 1803. Shrub. (B. R. 103; L. B. C. 378.)

M. genistifolia (Genista-leaved). *fl.* red, in loose oblong or cylindrical spikes; petals very deciduous. June. *l.* scattered, lanceolate or linear-lanceolate, rigid, acute, and often pungent-pointed. *h.* 4ft. (in its native habitats, 30ft. to 40ft.). 1793. A glabrous or pubescent shrub or tree. (S. E. B. 55.)

M. hypericifolia (Hypericum-leaved). *fl.* of a splendid scarlet; spikes cylindrical, quite glabrous. June to August. *l.* opposite, decussate, elliptic-oblong, with a recurved margin. *h.* 10ft. to 20ft. 1792. Shrub or small tree. (A. B. R. 200; L. B. C. 199.)

M. incana (hoary). *fl.* yellowish-white, rather small, in dense, terminal, ovoid or oblong spikes. July. *l.* scattered or irregularly opposite, or in whorls of three, very spreading, often crowded. *h.* 3ft. 1817. A hoary-tomentose or pubescent shrub. (B. R. 410.)

M. leucadendron (white-tree). Cajuput-tree. *fl.* white, in spikes, rather distant, glabrous; flowering branches pendulous. *l.* alternate, long-lanceolate, acuminated, falcate. *h.* 15ft. to 20ft. 1796. Stove tree. From the leaves of *M. l. minor* is obtained Cajuput Oil, a limpid, very volatile oil, of a pale bluish-green colour; its properties are stimulant, antispasmodic, and diaphoretic when administered internally, and externally applied it is rubefacient. The annually shed bark of the type is used by the Australian aborigines for tinder, for making shields and canoes, and for the covering of huts.

M. pulchella (neat). *fl.* reddish, usually solitary, glabrous. June to September. *l.* scattered or nearly opposite, oval or oblong, obtuse. *h.* 2ft. to 3ft. 1803. Shrub. (L. B. C. 200.)

M. squamea (scaly). *fl.* reddish-purple, white, or yellowish, rather small, in globular terminal heads; calyx villous. June. *l.* scattered, numerous, usually spreading, ovate-lanceolate to almost linear. *h.* 4ft. 1805. Shrub. See Fig. 533. (B. R. 477; L. B. C. 412.)

M. squarrosa (squarrose). *fl.* yellowish-white, sessile, in oblong cylindrical spikes of from 1in. to 2in.; bracts sometimes almost like the stem leaves. June to August. *l.* mostly opposite or nearly so, from broadly ovate-cordate to ovate-lanceolate, rigid, acute, almost pungent. *h.* 6ft. to 10ft. 1794. A handsome erect shrub. (B. M. 1935; L. B. C. 1130.)

M. striata (striped). *fl.* pink, in dense, oblong or cylindrical, terminal spikes. June. *l.* alternate, lanceolate or linear, acute, and often pungent-pointed, flat. *h.* 4ft. 1803. Shrub, with young shoots silky, at length glabrous. SYN. *M. Fraseri* (under which name it is figured in B. M. 3210).

Melaleuca—*continued.*

M. styphelioides (Styphelia-like). *fl.* white, in pubescent spikes, surrounding the lower part of the branches. May to July. *l.* alternate, ovate, acuminated, ending in a pungent mucrone, sessile, glabrous. *h.* 4ft. to 10ft. 1793. Shrub.

FIG. 533. FLOWERING BRANCHES OF MELALEUCA SQUAMEA, reduced and natural size.

M. thymifolia (Thyme-leaved). *fl.* purple; spikes few-flowered. June to September. *l.* opposite, lanceolate. *h.* 2ft. 1792. Shrub. (B. M. 1868; L. B. C. 439.) SYN. *M. coronata* (A. B. R. 278).

M. Wilsonii (Wilson's). *fl.* red, solitary or two or three together in the axils of the stem leaves, often numerous along the principal branches. *l.* opposite, almost imbricate on the smaller branches, linear or linear-lanceolate, erect or scarcely spreading. 1874. Shrub. (B. M. 6131.)

MELAMPYRUM (from *Melampuron*, an old Greek name used by Theophrastus, from *melas*, black, and *pyros*, wheat; alluding to the colour of the seeds of European field species, as they appear mixed with grain). Cow Wheat. ORD. *Scrophularineæ*. A genus comprising about six species of hardy, erect, annual herbs, found in Europe and Western Asia, one being broadly dispersed over Asia and North America. Flowers sub-sessile in the axils, or in dense terminal spikes; corolla yellow, violet, or variegated. Leaves opposite, narrow. The two species described below are the handsomest, but, in addition to these, *M. pratense*, the common Cow Wheat, and *M. sylvatica*, are found in Britain. Melampyrums, being more or less parasitic, are not easily grown under artificial conditions. Seeds should be sown annually, in spring, in the open border; if amongst short grass, &c., success is more likely to be attained.

M. arvense (field). *fl.* spiked; corolla erect; tube rosy, curved, puberulous; throat yellow; lips dark pink; bracts rose-purple, leafy. July and August. *l.* lanceolate, quite entire, or the upper toothed at the base. Stem 1ft. to 2ft. high, obtusely quadrigonous, stout, erect, branched, scaberulous. Europe (Britain), Western Asia. (Sy. En. B. 1001.)

M. cristatum (crested). *fl.* densely spiked; corolla tube yellow, tipped with purple, bent. September and October. *l.* spreading, narrow linear-lanceolate. Stem 6in. to 18in. high, rigid, erect, obtusely four-angled. Europe (Britain), Siberia. (Sy. En. B. 1000.)

MELANDRIUM. Included under **Lychnis** (which *see*).

MELANOPTERIS. Included under *Aspidium*.

MELANORRHŒA (from *melas*, black, and *rheo*, to flow; the tree, when wounded, yields a black juice). Black Varnish Tree. ORD. *Anacardiaceæ*. A genus comprising a couple of species of very large-growing stove evergreen trees, natives of Birma and the Malayan Peninsula. Flowers in axillary panicles; sepals five, cohering valvately into a five-nerved, caducous calyptra; petals five or six, linear-oblong, imbricated. Leaves alternate exstipulate, simple, entire, leathery. The undermentioned species thrives in a peat and loam compost.

Melanorrhœa—*continued.*

Propagated by cuttings of ripe shoots, with the leaves intact, placed in sand, under a glass, and in bottom heat.

M. usitatissima (most useful). *fl.* red. *l.* obovate, very blunt, villous. *h.* 100ft. Hindostan, 1828. This species yields a very valuable black varnish. "This is obtained by the process of tapping; short joints of bamboo, closed at the bottom end, being thrust into holes made in the trunk, and left for about two days, when they become full of a whitish thick juice, which turns black when exposed to the air, and requires to be kept under water in order to preserve it" ("Treasury of Botany").

MELANTHACEÆ. Included, by Bentham and Hooker, under *Liliaceæ*.

MELANTHERA (from *melas*, black, and *anthera*, an anther; alluding to the colour of the anthers). ORD. *Compositæ*. A genus comprising about eight species of scabrous-pubescent or slightly villous, stove, greenhouse, or half-hardy, herbs or sub-shrubs, natives of tropical America and Africa. Flower-heads white or yellow, mediocre; young ones depressed, at length sub-globose, borne at the apices of the branches or in the axils of the upper leaves; involucre hemispherical, short, the bracts two or three-seriate; receptacle convex or at length conical; achenes glabrous or slightly pilose. Leaves opposite, petiolate, toothed, or rarely hastately trilobed. The species thrive in any ordinary soil, and may be increased either by seeds or by divisions.

M. deltoidea (deltoid). *fl.-heads* yellow; involucral scales oval-oblong; chaff of the receptacle obtuse, mucronate. July and August. *l.* opposite, undivided, ovate-deltoid or sub-cordate, scabrous-canescent. *h.* 3ft. West Indies, &c., 1799. Stove herb. SYN. *Calea aspera*.

M. hastata (spear-shaped). *fl.-heads* white; involucral scales lanceolate; chaff of the receptacle spine-pointed. June and July. *l.* opposite, hastately trilobed, scabrous. *h.* 3ft. to 6ft. North America, 1732. Half-hardy herb. The variety *pandurata* has fiddle-shaped leaves.

MELANTHIUM (from *melas*, black, and *anthos*, a flower; in allusion to the darker colour which the persistent perianth assumes after blossoming). SYN. *Leimanthium*. ORD. *Liliaceæ*. A genus comprising only three species of hardy bulbous plants, confined to North America. Flowers yellowish-white, small, copiously racemose-paniculate; perianth of six widely-spreading segments. Leaves linear or lanceolate, membranous, glabrous. Stems loose, leafy. The species are not much grown in our gardens. For culture, &c., *see* **Veratrum**.

M. virginicum (Virginian). Bunch Flower. *fl.*, perianth cream-colour, turning brown, and persistent; segments heart-shaped or oblong and halbert-shaped. July. *l.* lanceolate or linear, grass-like, those from the root broader. Stem simple, 3ft. to 5ft. high. (B. M. 985, under name of *Helonias virginica*.)

MELASMA (from *melasma*, blackness; the plant turns black when dried). SYNS. *Gastromeria*, *Lyncea*, *Nigrina*. ORD. *Scrophularineæ*. A genus comprising three or four species of stove or greenhouse, scabrous-pubescent or hispid herbs, of which two (perhaps varieties of one) are natives of South Africa, the third is Brazilian, and the fourth Mexican. Flowers in terminal leafy racemes, which are sometimes long-interrupted at base; calyx broadly ovate-campanulate, foliaceous, five-fid at apex, the lobes valvate; corolla white or pale yellowish, five-lobed, imbricated; tube broad, sub-campanulate, shorter than the calyx or shortly exserted. Leaves opposite, sessile, entire, toothed, or slightly incised at base. Probably none of the species are in cultivation.

MELASPHÆRULA (from *melas*, black, and *sphærula*, a diminutive of *sphaira*, a ball; referring to the small blackish bulbs). SYNS. *Aglæa*, *Diasia*. ORD. *Irideæ*. A monotypic genus, the species being a very pretty, greenhouse, bulbous plant, with an elegant and graceful habit, and producing a profusion of flowers, which remain in perfection for a considerable period. For culture, *see* **Ixia**.

M. graminea (grass-like). *fl.* whitish, with a purplish stripe, disposed in large flexuous-branched panicles. April. *l.* grass-like,

Melasphærula—*continued.*

light green. South Africa, 1880. (B. M. 615; L. B. C. 1444, under name of *M. parviflora*; A. B. R. 62, under name of *Gladiolus gramineus.*)

M. parviflora (small-flowered). A synonym of *M. graminea.*

MELASTOMA (from *melas*, black, and *stoma*, the mouth; the black berries of certain species, when eaten, stain the mouth). ORD. *Melastomaceæ*. A genus comprising about forty species of stove evergreen, often erect, and strigose-pilose shrubs; one species creeping. They are natives of tropical Asia, Africa, North Australia, Oceania, and (one species) the Seychelles. Flowers purple, violet, or rose, rarely white, showy, bibracteate, at the apices of the branchlets, solitary, sub-fasciculate or paniculate; calyx strigose, setose, or paleaceous; lobes five, rarely six or seven; petals often five, obovate or unequilateral, sometimes ciliated at base. Leaves petiolate, oblong or lanceolate, coriaceous, entire, three to seven-nerved. Few of the species are now in cultivation. They thrive best in a compost of equal parts loam and peat. Propagated, during spring, by cuttings, placed in sandy peat, under a bell glass, in heat. In winter, a rather dry atmosphere is desirable.

M. corymbosum (corymbose). *fl.* bright purple, in terminal corymbs. Summer. *l.* stalked, cordate-ovate, glabrous, seven to nine-nerved, rich satiny-green above, paler beneath; margins sharply dentate-serrate. Tropical Africa. (B. M. 904.) By an oversight, this species was not described under *Amphiblemma*; its correct name is *A. cymosum* (B. M. 5473).

M. denticulatum (toothed). *fl.* white, few, cymose; calyx lobes lanceolate. July. *l.* petiolate, oval-oblong, acuminate, five-nerved, bristly above, pale beneath. *h.* 3ft. to 4ft. New Caledonia, 1855. (B. M. 4957.)

M. macrocarpum (long-fruited). A synonym of *M. malabathrica.*

M. malabathrica (Malabar). *fl.* purple, large; corymbs one to five-flowered. July. *l.* elliptic-oblong, obtuse at the base, acute at the apex, quite entire. Branches tetragonal, rough from strigæ. *h.* 6ft. to 8ft. East Indies, 1793. (B. M. 529; B. R. 672, under name of *M. macrocarpum.*)

M. sanguineum (bloody-veined). *fl.* purple, large, few, terminal; petals six, large. September and October. *l.* ovate-lanceolate, acuminate, five-nerved, green above and shining, but red at the nerves beneath and on the short petioles. *h.* 4ft. to 6ft. Straits of Sunda, 1818. (B. M. 2241.)

MELASTOMACEÆ. An order of erect herbs, shrubs, or trees, principally found in tropical America. Flowers variable in colour, showy, very rarely sweet-scented; inflorescence spicate, paniculate or corymbose, in a few cases solitary or fasciculate; calyx limb five, six, or three-partite, sometimes entire, imbricate, or contorted in the bud; petals free, or sometimes slightly united at the base, inserted on the calyx throat, on a fleshy annular layer, alternate with the calyx segments, shortly clawed, twisted in the bud. Leaves opposite or whorled, simple, equal or unequal, entire, rarely toothed, usually narrowed into a sometimes swollen petiole; stipules none. The order comprises about 134 genera, and 1800 species. Illustrative genera are: *Bertolonia*, *Melastoma*, *Miconia*, *Pleroma*, and *Rhexia.*

MELHANIA (from Mount Melhan, in Arabia Felix, where the original species of this genus was discovered). SYNS. *Brotera* and *Sprengelia*. ORD. *Sterculiaceæ*. A genus comprising about sixteen species of softly tomentose, stove or greenhouse shrubs or sub-shrubs, natives of Africa, the warmer parts of Asia, and tropical Australia. Flowers yellow, white, or reddish; petals five, rarely spreading; bracteoles often longer than the sepals; peduncles axillary, one or few-flowered. Leaves ovate or cordate, crenate-serrate. *M. erythroxylon* is a handsome greenhouse shrub or small tree, of which only a very few individuals now exist in its native habitat. *M. melanoxylon* (also from St. Helena) has, within comparatively recent years, become quite extinct in a wild state, and, probably, no longer exists even in cultivation.

M. erythroxylon (red-wooded). *fl.* at first pure white, changing after a day to pink, and finally to a brownish-red as they begin to fade. June. *l.* ovate-cordate, somewhat peltate, acuminated, crenulated, tomentose beneath. *h.* 15ft. St. Helena, 1772. The wood of this tree is hard and of a dull brown colour. (B. M. 1000.)

MELIA (from *Melia*, the Greek name for the Ash; in allusion to the resemblance in the leaves). Bead-tree. ORD. *Meliaceæ*. A genus comprising about five species of stove, greenhouse, or half-hardy trees, natives of tropical Asia and Australia, one species being widely dispersed by introduction. Flowers white or purple, in large, axillary, much-branched panicles; calyx five or six-parted, imbricated; petals five or six, free, linear-spathulate, spreading. Fruit drupaceous, small. Leaves alternate, pinnate, or bi- or tripinnate; young ones, together with the inflorescence, often stellato-tomentose; leaflets petiolulate, dentate or serrate. Branches covered with scars. The species are of easy culture in a sandy-loam soil. Propagated by cuttings, placed in sand, under a bell glass, in gentle bottom heat. The name Bead-tree has been given to the species of this genus, on account of the use made of the seeds in Catholic countries, "where the nuts are threaded for beads, to assist the devotion of good Catholics, for which purpose they are peculiarly suited, having a natural perforation through the centre; hence the tree has been called *Arbor Sancta*" ("Botanical Magazine").

M. Azadirachta (Azadirachta). *fl.* bluish. Summer. *l.* pinnate; leaflets ovate-lanceolate, unequal at the base, acuminated, dentately-serrated; petioles terete. *h.* 20ft. East Indies, 1759. Stove. (B. F. S. 14.)

FIG. 534. PORTION OF INFLORESCENCE OF MELIA AZEDARACH.

FIG. 535. FLOWERING BRANCH, AND DETACHED FLOWER AND FRUIT, OF MELIA AZEDARACH FLORIBUNDA.

M. Azedarach (Azedarach). *fl.* lilac, fragrant. Summer. *l.* bipinnate; leaflets deeply serrated, somewhat quinate. *h.* 40ft. Tropical Asia, &c., 1656. Hardy in the South of England. See Fig. 534. (B. F. S. 13; B. M. 1066.) *M. A. floribunda* is more floriferous than the type, and flowers in a smaller state. See Fig. 535. (R. H. 1872, 470.)

M. composita (compound). A synonym of *M. dubia.*

Melia—*continued.*

M. dubia (doubtful). *fl.* whitish or pinkish; peduncles, calyces, and petals rather velvety. Summer. *l.* somewhat bipinnate, but at the apices of the petioles they are simply pinnate; leaflets almost entire, lower ones ternate. *h.* 30ft. Tropical Asia, Australia, and Africa, 1810. Stove. SYN. *M. composita.*

M. japonica (Japanese). *fl.* lilac, fragrant, in large axillary panicles. Summer. *l.* large, bipinnate; leaflets few, distant, ovate, crenate. *h.* 20ft. to 40ft. Japan, 1865. A very ornamental half-hardy tree.

M. sempervirens (evergreen). *fl.* bluish. Summer. *l.* bipinnate; leaflets deeply toothed, usually seven in number, shining when young. *h.* 25ft. Jamaica, 1656. Stove. (B. R. 643.)

MELIACEÆ. A rather large order of trees and shrubs, very rarely sub-herbaceous. They are found principally in the tropical parts of Asia and America. Flowers dicœcious, or rarely polygamo-dicœcious, regular, terminal or axillary, panicled; calyx generally small, four or five-fid; æstivation usually imbricate; petals hypogynous, four or five, rarely three to seven, sometimes free and contorted or imbricate, sometimes connate, or adnate to the staminal tube, and valvate. Leaves alternate, exstipulate, very rarely dotted, pinnate, or rarely simple, entire. The wood of many species of *Meliaceæ* is often called Cedar, and is esteemed, not only on account of its aromatic fragrance, but for its density and fine colour. To this order belongs *Swietenia Mahagoni*, which yields the Mahogany of commerce. There are about thirty-seven genera and 270 species. Examples are: *Aglaia*, *Melia*, and *Swietenia*.

MELIANTHEÆ. A tribe of *Sapindaceæ.*

MELIANTHUS (from *meli*, honey, and *anthos*, a flower; calyces full of honey). Honey Flower. ORD.

FIG. 536. FLOWERS AND LEAF OF MELIANTHUS COMOSUS.

Sapindaceæ. A small genus (four species) of half-hardy or greenhouse, glaucous or canescent, often strongly scented shrubs; they are natives of the Cape of Good Hope, but one is found on the Himalayas, where it has been introduced. Flowers shortly pedicellate, bracteate; lower ones sometimes apetalous; racemes terminal and axillary; calyx five-parted; petals five, narrow, long-clawed. Leaves alternate, stipulate, impari-pinnate;

Melianthus—*continued.*

leaflets unequally toothed, decurrent. The species most frequently seen in cultivation is *M. major*; this is a very ornamental plant, and is largely employed in sub-tropical gardening. It is not, strictly speaking, hardy, but thrives very well in the open air, throughout the year, if the roots are protected, in the winter, by a covering of leaves. It makes an admirable conservatory plant. Propagated by seeds, or by cuttings, which latter strike freely under a hand glass.

M. comosus (tufted). *fl.* green at base; sepals and petals orange-yellow within, the larger marked externally with a red spot. Autumn. *l.* 4in. to 6in. long; leaflets lanceolate, serrate. *h.* 3ft. to 5ft. Greenhouse. See Fig. 536. (B. M. 301, under name of *M. minor.*)

FIG. 537 MELIANTHUS MAJOR.

M. major (great).* *fl.* brownish, in rather long spikes springing from the axils of the upper leaves. Summer. *l.* stem-clasping, smooth, glaucous; leaflets four or five, large, deeply cut into acute divisions. Stems hollow, woody at base. *h.* 4ft. to 6ft. 1688. Greenhouse. See Fig. 537. (B. R. 45.)

M. minor (small). *fl.* dark brown, in whorls; racemes axillary, elongated, drooping. August. *l.* smooth above and hoary beneath. *h.* 5ft. 1696. Greenhouse.

M. pectinatus (pectinate). *fl.* in whorls of four to six; petals four, scarlet, clawed; disk fleshy, horseshoe-shaped; racemes terminal, erect, 4in. to 8in. long. Winter. *fr.* ¾in. in diameter, cruciately four-winged. *l.* 3in. to 5in. long, shortly petioled, glabrous above, white-tomentose beneath, pinnate; pinnules six to ten pairs, opposite, linear-strap-shaped. *h.* 6ft. to 10ft. A singular and beautiful conservatory plant. (B. M. 6557, under name of *M. Trimenianus.*)

M. Trimenianus (Dr. Trimen's). A synonym of *M. pectinatus.*

MELICHRUS (from *melichros*, honey-coloured; in reference to the colour of the glands of the flowers). ORD. *Epacrideæ.* A small genus (two species) of very ornamental greenhouse shrubs or sub-shrubs, with a procumbent or somewhat erect habit, restricted to Eastern temperate Australia. Flowers erect; corolla rotate or urceolate, furnished near the base with five glands, alternating with the stamens; segments bearded. Leaves sessile, lanceolate. The species thrive best in sandy peat. Propagated by cuttings of the shoots, about 2in. long, inserted in sandy soil.

Melichrus—*continued.*

M. medius (intermediate). A synonym of *M. urceolatus.*

M. rotatus (wheel-shaped). *fl.* scarlet; corolla rotate. June. *l.* lanceolate-linear, pilose on both surfaces and on the margins. 1824. Procumbent shrub.

M. urceolatus (urceolate). *fl.* scarlet; corolla urceolate. April. *l.* lanceolate, attenuated, very acute, mucronate, concave, with membranous, denticulated edges. *h.* 2ft. 1824. Erect shrub. SYN. *M. medius.*

MELICOCCA (from *meli*, honey, and *kokkos*, a berry; the taste of the fruit is very sweet). ORD. *Sapindaceæ.* A genus comprising two or three species of stove trees, generally very glabrous, natives of the West Indies, Brazil, and Venezuela. Flowers regular, polygamo-diœcious; racemes elongated, simple or paniculately branched, many-flowered. Drupe ovoid, edible. Leaves alternate, exstipulate, abruptly pinnate; leaflets two or three-jugate, almost opposite, sessile, membranaceous. The species thrive in a compost of loam and peat. Propagated by ripened cuttings, placed in sand, under a bell glass, in heat.

M. bijuga (two-paired). Honey Berry. *fl.* yellow; racemes terminal and axillary, simple, spike-formed. *fr.* as large as a bullace, jet-black, with a very sweet, pleasant taste. *l.* with two pairs of leaflets. *h.* 40ft. to 50ft. West Indies, &c., 1778.

MELICOPE (from *meli*, honey, and *kope*, a division; in allusion to the four honey-glands at the base of the ovaries). ORD. *Rutaceæ.* A genus consisting of about fifteen species of gland-dotted, glabrous, greenhouse shrubs, natives of New Zealand and the Pacific Islands. Flowers white, rather small; cymes axillary, three-flowered, or paniculately branched and many-flowered. Leaves opposite (rarely alternate), simple or one to three-foliolate, very rarely pinnate; petioles simple or winged; leaflets entire or crenate. The species described below is the only one known to cultivation. It thrives in a compost of sandy loam, with a little peat and leaf mould. Propagated, in May, by cuttings of small side shoots, inserted in sand, under a bell glass.

M. ternata (three-leafleted). *fl.* greenish-white, in peduncled, trichotomous, axillary cymes. June. *l.* opposite, trifoliolate; leaflets 3in. to 4in. long, ovate or linear-oblong, acute, entire, longer than the petioles. *h.* 12ft. to 15ft. New Zealand, 1822.

MELILOT. *See* **Melilotus.**

MELILOTUS (old Greek name used by Dioscorides, from *meli*, honey, and *Lotus*; the plants are said to be the favourite resort of bees). Melilot. ORD. *Leguminosæ.* A genus comprising about forty species of hardy herbaceous plants, of no horticultural value, allied to *Trifolium.* Flowers yellow or white, disposed in loose racemes. Leaves trifoliolate; leaflets usually toothed. The genus is represented in the British Flora by three species, one or more often being cultivated as "Bee Plants."

MELISSA (from *melissa*, a bee; bees are said to gather honey from these plants). Balm. ORD. *Labiatæ.* A genus containing three or four species of hardy herbaceous perennials, or very rarely under-shrubs, natives of Central and Western Asia. Flowers white or yellowish, variously disposed, racemose or whorled. For culture, *see* **Balm.**

M. officinalis (officinal). Common Balm. *fl.* white or pale yellow; cymes distinct, three to six-flowered; whorls distant. June to October. *l.* broad-ovate, crenated, truncate at the base, or cordate. Stem herbaceous, erect, branched. *h.* 2ft. to 4ft. Central and South Europe (Britain), naturalised in West Asia. (Sy. En. B. 1053.) A variegated form is sometimes seen in cultivation, and forms a very pretty edging plant in almost any soil; it is, moreover, very fragrant.

MELITTIS (from *melitta*, another form of the Greek *melissa*, a bee, to which insect the plant was considered specially grateful). Bastard Balm. ORD. *Labiatæ.* A monotypic genus, the species being a very handsome, hardy, native perennial. It thrives almost anywhere, and in any soil; but, in a slightly-shaded spot, and in well-enriched loam, the result will amply repay the trouble taken. The plant is most distinct in character, and should be grown extensively on the margins of shrubberies, and in

Melittis—*continued.*

herbaceous borders generally. Propagated by dividing the plants after flowering.

FIG. 538. MELITTIS MELISSOPHYLLUM.

M. Melissophyllum (Balm-leaved).* *fl.* cream-white, spotted pink or purple; corolla 1½in. to 2in. long; whorls about six-flowered, axillary. May. *l.* on short petioles, 1½in. to 2in. long, ovate, crenated, cordate at the base, opposite, slightly hairy. Stems erect, simple, more or less hairy. *h.* 1ft. to 1½ft. Europe (Britain). See Fig. 538. (Sy. En. B. 1062.) The variety known as *grandiflora* differs in having the corolla cream-coloured, with the middle of the lower lip purplish-red. (Sy. En. B. 1063.)

MELLEOUS. Having the taste or smell of honey.

MELLIFEROUS. Honey-bearing.

MELOCACTUS (from *Melon*, a Melon, and *Kaktos*, a name applied by Theophrastus to a spiny plant; the species of this genus are melon-formed, and their angles are beset with tufts of spines). Melon Thistle. ORD. *Cacteæ.* A genus comprising about thirty species of stove succulent plants, inhabiting Mexico, Brazil, and the West Indies, a few being found in New Granada. Melocactuses are not often seen in cultivation, and are more

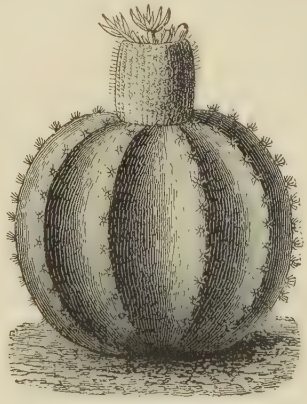


FIG. 539. MELOCACTUS COMMUNIS.

grotesque than beautiful. They closely resemble each other in general characters, which are "a globular, unbranched, fleshy stem, 1ft. to 3ft. in diameter, regularly ribbed from base to summit, the ridges bearing a varying number of clusters of spines, and a cylindrical portion, termed the cap, produced from the apex of the stem, formed of a woolly substance, and closely-set, softer spines than those on the main stem. Upon this the

Melocactus—*continued.*

small flowers are borne, tubular in form, and red or rose-coloured" (Castle, "Cactaceous Plants"). The species generally grow in exceedingly dry, rocky or sandy situations. The one most generally cultivated is *M. communis*, which is very difficult to grow with anything approaching success. Essential elements in its culture are a high temperature, very porous soil, plenty of drainage, and but little water. *See also* **Cactus.**

M. communis (common). Melon Cactus; Turk's Cap. *fl.* rosy-red, tubular, 1in. long. Stems from 1ft. to 1½ft. high, 1ft. in diameter; ridges from twelve to twenty, 1in. to 1½in. deep, conical, bearing clusters of eight or nine spines, ¼in. to 1in. long. West Indies, 1788 See Fig. 539. (B. M. 3090.)

M. depressus (depressed). *fl.* rose-coloured. July. *fr.* a club-shaped berry, about 1in. long. Stem depresso-conical, not more than 6in. across, with rounded sides; ribs about ten, acute, each bearing four or five clusters of strong, spreading, pale brown or ashen-green spines, five to seven in a cluster; at the summit of the stem is a short crown, less than ⅜in. high, and about 2½in. in diameter, of woolly substance, filled with exserted red aculei. Pernambuco. (B. M. 3691.)

M. Ellemeetii (Ellemeet's). *fl.* rose-colour, rather small. Stems ovoid, depressed, ten-ribbed; ribs separated by broad sinuses; spines seven or eight, rather short, similar. Bahia, Brazil, 1872.

M. Schlumbergerianus (Schlumberger's). This species forms a globular, glaucescent, furrowed mass, about 6in. in diameter, and as much in height; the angles are fifteen in number, elevated about 1in., and bear clusters of about nine radiating spines, which are white, with black points; the terminating tuft, or cap, is about 1in. high and 2in. broad. St. Thomas' Island, 1861.

MELODINUS (from *melon*, an apple, and *dineo*, to turn round; referring to the shape of the fruit). SYNS. *Bicorona*, *Lycimnia*. ORD. *Apocynaceæ*. A genus comprising about fifteen species of woody-stemmed, often climbing, stove shrubs, natives of the East Indies, South China, the Malay Archipelago, the Islands of the Pacific, and tropical Australia. Flowers white, often fragrant, disposed in short terminal cymes; corolla with a cylindrical tube, and five oblique or sickle-shaped, spreading lobes; the mouth of the tube furnished with a coronet composed of five to ten small erect scales. Fruit a globose two-celled berry, pulpy inside. Leaves opposite, penniveined. The only species yet introduced is the one here described. For culture, *see* **Dipladenia.**

M. monogynus (one-styled). *fl.* white, fragrant; panicles axillary and terminal, sub-globular, brachiate, crowded. July. *fr.* yellow, four-cornered, the size of an orange, containing an edible pulp. *l.* lanceolate, shining, acuminated Northern and Eastern India, 1820. (B. M. 2527; B. R. 834.)

MELOLONTHA VULGARIS. *See* **Cockchafers.**

MELON (*Cucumis Melo*). The Melon produces the richest and most highly valued fruit of any plant in the family to which it belongs, and its crop is one of the most important each year for dessert and other purposes. It is supposed to be a native of the hotter parts of Asia, and to have been introduced from there to Europe at the commencement of the Christian era. In some parts of the East, where Melons grow plentifully in the open air, the fruit forms one of the chief articles of food for the inhabitants. In this country, where success is rarely attainable without glass houses, or frames, and artificial heat, the product is, in consequence, one of comparative luxury. The Melon is a trailing plant, unless trained to cover trellises, &c., when, by the use of its numerous tendrils in retaining a hold, it becomes partially self-supporting as a climber it is of annual duration. The flowers are monœcious, and are produced in the axils of the leaf-stalks (see Fig. 540), the males being by far the most numerous of the two sexes. Plants only succeed well during the summer, when there is plenty of light and sun for ripening the fruits, and causing them to attain the highest flavour. The season for the best fruits is, therefore, limited to the six months beginning with May; and, for the earliest crops, preparations must commence in January, or early in February. It is advisable to sow a few seeds, from this time until July, at intervals of about three weeks, as various circumstances may tend to render one or more batches useless, and then others will be ready to take their place in a short time afterwards. Melons are raised in any quantity, from seeds, and it is very important that these should be obtained from a reliable source. Where numerous varieties, or even any number beyond one, are grown together, there is a danger of the flowers becoming naturally or artificially cross-fertilised; and, again, if good specimens of fruit are not selected for seed-bearing, deterioration soon takes place. The seeds are best placed singly, or two each, in small pots, with a view, in the latter instance, of removing the weakest plant in due course. A compost of loam and leaf soil is most suitable, and the pots should be plunged in a frame where there is a bottom heat of about 75deg. Considerable attention is requisite in the early part of the year, in respect of inuring young plants to air and light, with a view to getting them strong before being permanently planted. So soon as the first leaf appears, beyond those produced by the seed, the plants are generally fit for repotting. This operation should be carefully performed, to avoid injuring the tender roots, and the soil, before being used, should, for the same reason, be placed where it can become warm throughout. Allowing seedling Melons to become starved in their pots, before planting, is a bad system, unfortunately too commonly practised. It is far better to sow frequently, and plant only such as are healthy, and in a free-growing state, discarding others as soon as it is known they will not be required.

Melon—*continued.*

Soil. Melons succeed best in a rather strong, heavy loam, which should be of a friable, rather than of an adhesive, nature. Some growers recommend cutting turf, 3in. thick, from a pasture, breaking it in pieces, and using at once; while the more general plan, in gardens, is, perhaps, that of reserving a small stack purposely for growing Melons and a few other plants, such as pot Strawberries, which require similar heavy soil. A little well-rotted manure is sometimes added, but it should only be sparingly applied, or the soil may become too rich, and induce an over-luxuriant growth. The better plan is to give manure water after a crop of fruit is set, or to substitute a richer compost as a top-dressing, if an additional one is required, at the same period. The soil for Melons should be rammed very firm before planting time, or when an addition is made round their roots. It matters little how hard the bulk is made; roots readily permeate the whole, if kept quite moist, as it should be—at least, till the fruits begin to ripen.

FIG. 540. LATERAL GROWTH OF MELON, showing (*a*) Male and (*b*) Female Flowers.

Melon—*continued.*

Culture in Frames. Where a quantity of Melons have to be supplied, and houses suited for their culture are not obtainable, the ordinary pits and frames have, of necessity, to be utilised for growing them. In summer, this is not difficult, especially with some of the hardier sorts; but, in spring, there are many disadvantages in not being able to attend to the plants without having them exposed to the air. Pits for Melon culture may or may not be heated by hot water; in either case, the bottom heat is usually supplied by fermenting material, into which the roots are allowed to extend. This, and the soil, should be prepared, and put in a few days before the plants are inserted, in order that rank steam may escape, and everything become warmed to a suitable temperature. Some soil should be incorporated with the dung on the surface, and small mounds of soil alone made where it is intended to plant—say, under the centre of each sash, if there is sufficient space between for the plants to develop. In training Melon plants in frames, the points should be pinched out when the second or third rough leaf is expanded. Two branches will then proceed from the axils of the lower leaves; one should be trained towards the front, and the other towards the back of the frame. When these extremities are nearly reached, pinch out the points again, and fruiting laterals will be those next produced. The chief aim will then be to get enough flowers fertilised to eventually form a crop. This process, called "setting," is generally performed artificially, when the weather is fine, and plenty of air can be admitted. It consists in transferring dry pollen from the anthers of the male to the stigma of the female flowers, when both are in a fully expanded state. The operation may be performed by means of a camel's-hair pencil, or by detaching a male flower, removing its corolla, and applying the pollen direct. It is best to allow only one fruit on a lateral; if more are set, they should be removed. When any commence swelling with certainty, the lateral on which they are growing should be stopped at the point, and a piece of slate, or board, placed beneath each fruit, to keep it clean. The sub-lateral growths made afterwards must be kept somewhat thinned, so as to admit the sun and light necessary for perfecting the fruit.

Cultivation in Houses. Although large numbers of Melons are grown successfully in frames, superior accommodation, in every way, is afforded in houses, the plants being fully under control for receiving the necessary attention. Houses used in winter for forcing or plant-growing, may be utilised throughout the spring and summer for Melons, if special provision cannot be made. For early supplies, small lean-to or half-span houses, about 10ft. wide, and facing south, are best adapted; and an ample supply of heat should be at command. Melons succeed much better with than without bottom heat. It is sometimes supplied by pipes fixed in the bed beneath where they are planted out; and, at others, by fermenting material placed to the depth of 2ft. or 3ft. Where pipes are in use, they should be surrounded with clinkers, or other material, through which the heat may pass readily to the soil in which the Melons are grown. This should be placed in mounds, not less than 4ft. apart, near the centre of the bed, and allowed to remain until thoroughly warmed through. The plants, having been previously prepared in pots, and not allowed to become starved, or infested with insects, may then be inserted, one in the middle of each mound, the collar being kept a little above the surface, and the soil pressed firmly round the roots. A trellis must be provided, about 1ft. from the glass, if one is not already fixed, and a stake placed at once to each plant, to prevent it getting broken. The training of Melons is differently practised in houses to what it is in frames. The main shoot is encouraged to

Melon—*continued.*

grow nearly to the top of the trellis before being stopped. Side shoots, which then appear from the axil of nearly every leaf on the main stem, invariably bear female blossoms, and it is advisable, before any are fertilised, to wait until a sufficient number of these open at one time to form the crop. When one or two fruits are allowed to take the lead, they swell rapidly, and later ones frequently turn yellow, and drop off. About six fruits will be enough for plants occupying the space above given, and, if this number can be successfully fertilised about the same time, they will each have a good chance of swelling. A support must be placed beneath each fruit before it becomes very heavy, to prevent it breaking down, or, when getting ripe, becoming detached from the stalk, and falling. A small board, with a string or wire secured to each corner, for tying to the trellis, is a handy method much practised, the boards being equally useful for several fruits. Ripening will be indicated by the fruit parting from its stalk, changing colour, and emitting a strong perfume, not before observable. It may then be cut, laid for a time in the sun, and afterwards in a cool, airy fruit-room, until required for use. The period during which a Melon is at its best is a short one, and it is very important to know from experience, as near as possible, when this period is, and to send the fruit for dessert at the right time. Hastening or retarding the ripening process, to supply at certain dates, may be accomplished by exposing to a higher or lower temperature, which, in either case, should be a somewhat dry one.

Some growers cultivate Melons, in summer, on what is called the extension system, and many of the free-growing varieties succeed admirably when thus treated. A large house, in which the air is warmed by hot-water pipes, and the bed heated similarly, or with fermenting material, is planted with Melons in the usual way, or at greater distances apart, the object being to allow a less number of plants to grow without much restriction, and keep on producing fruits. Thus, if three plants are inserted, the centre one may be cropped and removed, and the others allowed to occupy the space afterwards; or the two permanent ones only may be inserted at first. Under this system, it will be necessary to have additional soil supplied, to keep the plants growing. Watering, so far as is requisite, must be continued, and air admitted more freely when successional fruits are being fertilised. It would be well for the inexperienced to try this plan before generally adopting it, as the treatment of plants respecting the ventilation, watering, and other details, must, of course, be different where the same house contains fruits in the several stages of flowering, swelling, and ripening. The advantage claimed is the larger, more juicy, and highly-flavoured fruit, because obtained from plants whose sap is allowed free circulation, consequent on less restriction being practised in training the branches.

Shading and Temperature. Seeds of Melons, when sown in pots, should be plunged in a bottom heat of about 75deg., either inside a dung frame or in a heated house. In the early part of the year, the young plants must be very carefully treated, by gradually exposing them to light before there is a possibility of their getting drawn. Later on in the season, as the days lengthen, they grow more strongly from the first. A light shading should be temporarily applied in hot weather, to prevent flagging; but Melons bear a good deal of sun without injury, if properly watered and ventilated. The temperature of the Melon house or pit, in spring, may be from 60deg. to 65deg. by night, with a rise of 10deg. by day. Air must be very cautiously admitted during March and April, and the house or pit shut up early on bright days, to take advantage of the sun heat. If the latter raises the temperature after

Melon—*continued.*

closing to 90deg., when the plants are growing, and there is plenty of moisture about, no harm will be likely to result. During the flowering period, more air must be admitted, and a drier atmosphere maintained. In summer, but little fire heat need be given, and none will be necessary, as a rule, during the latter part of June and in July. Plenty of air should be given early in the day when a great heat is expected.

Watering. Melons require abundance of water and frequent syringing when they are growing freely. Both must be regulated according to the time of year, and the amount of light and sun heat available. All the water used for both purposes should either be heated, or allowed to stand and become warmed to the temperature of the house. In frames, where there is a depth of manure into which the roots penetrate, watering need not be so frequently practised as in houses, where a comparatively small mound of soil is placed above hot-water pipes. When the plants are growing, and also after the fruits are set, water should be frequently thrown about the passages and round the walls of the house, unless the weather be dull and wet; but when flowering, and so soon as ripening commences, the air and soil must be kept drier, and the fruits in the later stages allowed exposure to the sun, which materially contributes to their good flavour.

Insects, &c. The most injurious insect commonly found on Melons is Red Spider, very few batches of plants escaping its attack altogether. It is important to start with a clean house or pit, and also to have plants free from such a troublesome pest. In the early stages of growth, the leaves may be examined separately, at frequent intervals, and if any insects are detected, they may be carefully sponged off. The leaves are, however, so brittle that this cannot readily be performed without injury. The best plan of removing the insect is to syringe with as much force as the leaves allow, using soft rain water, which has been standing in the house to become warmed. Melon leaves will not withstand the use of insecticides that are applied to many other plants. Green or Black Fly, if allowed a footing, increase rapidly; consequently, their appearance should be watched for, and the usual remedy of fumigating with tobacco smoke applied. Some caution in this performance is necessary, as the leaves may be easily injured thereby.

Melons not unfrequently damp off, just at the neck of the plant. It is considered that one great cause of this disease—if it really is one—is a close and over-moistened atmosphere. The remedy of constant ventilation, if only very slight, will naturally be suggested, and a little powdered lime and charcoal, applied when the first symptoms are seen, will often dry up the affected tissues, and prevent further injury. The stem and roots are also sometimes attacked by canker, which is not generally observable until the leaves give indications by flagging, and the plants die in a short time. A small nematoid worm, also, now and then, attacks the roots, living inside the tissues, and causing them to decay. The injured parts, or, better still, the whole plant and roots, should be burned, and the use of any part of the soil avoided for a future crop. Unhealthy plants, or those subjected to checks from improper airing, watering, or other causes, are most liable to canker; sturdy, free-growing ones are far less frequently attacked.

Sorts. There are few kinds of fruit amongst which natural or artificial cross-fertilisation is practised with greater ease for the production of new varieties, than amongst Melons; hence the appearance of such a numerous quantity of so-called new or improved sorts each year. A few of the old ones are only with difficulty surpassed; and a selection from those of recent years

Melon—*continued.*

presents a standard of excellence, on every point, which it is most desirable to maintain. Deterioration soon takes place, and good varieties may readily be lost by allowing their fruits to be cross-fertilised; consequently, it is well to keep raising some new ones, with a view of, at least, preserving a high standard, and, possibly, further improving it. A thin skin, quality, size, and productiveness, are the most important properties. If one or two sorts are found to suit in these particulars, they should be grown; others should only be admitted

FIG. 541. CANTALOUP MELON.

for experiment, unless proved to be superior. The Cantaloup Melon (see Fig. 541) is supposed to have been one of the first ever cultivated in Europe. It has a

FIG. 542. COULOMMIER'S MELON.

remarkably irregular surface, and both the skin and flesh are variable in colour. Coulommier's Melon (see Fig. 542) is only remarkable for its hardiness and the size of its

FIG. 543. EMBROIDERED MARKET MELON.

Melon—*continued.*

fruits; it is cultivated, almost without shelter, in the open fields in Normandy, &c. The Embroidered Market Melon (see Fig. 543), also a netted variety, bears a large nearly spherical fruit, with orange, or reddish-orange

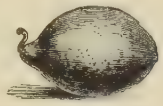


FIG. 544. FIGARI MELON.

flesh; the ribs are not prominent. The Figari (see Fig. 544) is an ornamental and small-fruited Melon, probably of African origin. Its obovoid fruits are scarcely as large as a medium-sized hen's egg; they are smooth and yellow when ripe, and exhale a very decided Melon odour, but are not edible, being only cultivated for

FIG. 545. PERSIAN MELON.

ornament, garnishing, &c. The Persian Melon (see Fig. 545) has elongated pear-shaped fruits, of medium size, without ribs, not, or only slightly, netted; the rind is yellow, marbled with dark green; the flesh is greenish-white, and very sugary; this sort keeps a long time.

FIG. 546. QUEEN ANNE'S POCKET, OR DUDAIM, MELON.

Queen Anne's Pocket, or Dudaim (see Fig. 546), does not differ markedly in foliage and habit from ordinary Melons, but its very small round fruits, marbled with brown on an orange or orange-red ground, distinguish it at once from all others; it is probably of African origin. The fruits, when ripe, have a very strong odour, but are not edible; they are only of use for garnishing and decorative purposes.

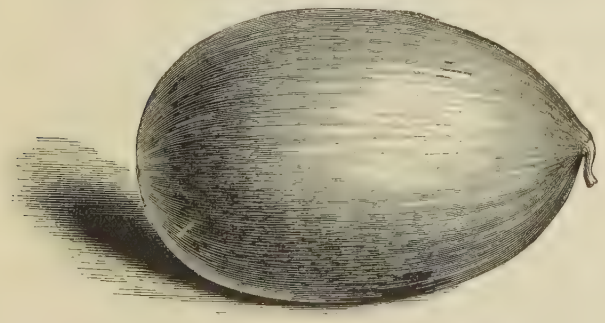


FIG. 547. WINTER MELON.

The Winter Melon (see Fig. 547) is the largest of the white-fleshed kinds, but is also one of the least desirable. The fruit is elliptic, more or less elongated, rarely subspherical, with a smooth or faintly netted skin, and thick flesh; it varies much in size and colour, the latter ranging from dark green to creamy-white or yellow. This sort is cultivated in open fields in the South of Europe.

Melon—*continued.*

Melons are usually divided into two, and sometimes into three, classes, according to the colour of their flesh inside the skin. For all practical purposes, the two under which the subjoined limited selection of varieties are classed, are amongst the best in cultivation. Doubtless, there are very many others considered of equal or superior merit, according to the views of different cultivators and consumers of the fruit.

Class I. Green and White-fleshed.

Cashmere (Meredith's). Fruit medium or large, oval, slightly ribbed; skin thin, yellow when ripe, not much netted, flesh nearly white, very juicy, and of excellent flavour. An old variety, but, when well grown, one of the best in cultivation.

Colston Bassett Seedling. Fruit slightly obovate; skin yellow, beautifully netted; flesh whitish, melting, very juicy.

Eastnor Castle. Fruit medium or large, from 3lb. to 4lb. in weight; skin pale yellow; flesh melting, and very rich. A free grower and bearer; one of the best, but does not keep long.

Gilbert's Green-fleshed. Fruit large, oval, greenish-yellow; flesh melting and juicy.

Golden Gem (Cox's). Fruit round, yellow, netted; flesh whitish-green, of good flavour.

Golden Queen. Fruit medium, round; skin thin, golden-yellow, beautifully netted; flesh very juicy. Plant of a hardy constitution.

Hero of Lockinge. Fruit medium; skin rich golden-yellow, with white lacing; flesh white, melting, of very fine flavour. An excellent variety, either for pits or houses.

Queen Emma. Flesh almost white, tender, and melting, with thin rind. A large, handsome, free-bearing variety, of strong constitution.

Victory of Bath (Gilbert's). Fruit large, slightly oval; skin greenish-yellow, not much netted; flesh green, juicy, and richly flavoured. Plant of moderate growth.

William Tillery. Fruit large, handsome; skin dark green, thin; flesh pale green, juicy, sweet, and of excellent quality. One of the best varieties if well grown.

Class II. Scarlet-fleshed.

Blenheim Orange. Fruit medium or large, and of excellent flavour. Plant of good constitution, and remarkably prolific; one of the best of this class.

Read's Scarlet-fleshed. Fruit medium size, beautifully netted, more oblong than Scarlet Gem; flesh solid, and of good quality. An old but excellent sort.

Scarlet Gem. Fruit nearly round, handsomely netted all over. A constant, free-bearing variety, of excellent flavour.

Scarlet Premier. Fruit handsome, slightly oval, highly coloured and beautifully netted; flesh solid, thick, having a delicate aroma.

MELON, MUSK. *See* **Cucurbita moschata.**

MELON THISTLE. *See* **Melocactus.**

MELON, WATER. *See* **Citrullus vulgaris.**

MEMBRANOUS, MEMBRANACEOUS. Having the texture of a membrane.

MEMECYLEÆ. A tribe of *Melastomaceæ.*

MEMECYLON (the Greek name used by Dioscorides for the fruit of the Arbutus). SYN. *Scutula.* ORD. *Melastomaceæ.* A genus consisting of about 100 species of very glabrous trees and shrubs, inhabiting Asia, Australia, the Pacific Islands, tropical Africa, and Ceylon, many being found on the seashores. Flowers white or bluish, frequently axillary, or springing from below the leaves, or terminal, fasciculate, or in panicles. Leaves sessile or shortly petiolate. Various dyes are extracted from some of the Cingalese species. *M. edule* has edible but astringent berries. The species are unknown to cultivation in this country.

MENINIA TURGIDA. A synonym of **Cystacanthus turgida** (which *see*).

MENISCIUM (from *meniskos*, a crescent; referring to the shape of the spores). ORD. *Filices.* A genus comprising ten species of very distinct stove ferns, almost confined to the tropics. Fronds simple or once pinnate. Sori oblong or linear, occupying the connivent transverse veinlets. The species generally do well

Meniscium—*continued.*

in a loamy soil, and should always be kept moist at the roots, without stagnation. For general culture, *see* **Ferns.**

M. angustifolium (narrow-fronded). *sti.* sub-tufted, 6in. to 18in. long, firm, erect, slightly pubescent. *fronds* 1½ft. to 2ft. long, 1ft. broad; pinnæ spreading, 4in. to 6in. long, ¼in. to ⅔in. broad, gradually narrowed to a long acuminate point, the edge sub-entire, the base cuneate, the lower ones often stalked; fertile pinnæ much narrower than the barren ones; rachis pubescent. *areolæ* four to six between the midrib and edge. West Indies to Peru.

M. giganteum (gigantic). *sti.* 1ft. long, dark brown, slightly pubescent. *fronds* simple, 1½ft. to 2ft. long, 4in. broad, elongate-oblong, narrowed rather suddenly at both ends, the edge slightly repand. *areolæ* thirty to forty between the midrib and edge. Peru. A rare species in cultivation.

M. palustre (marsh). A synonym of *M. serratum.*

M. reticulatum (netted). *sti.* tufted, 1ft. to 3ft. long, stout. *fronds* pinnate, 2ft. to 4ft. long, 1ft. or more broad; pinnæ 6in. to 12in. long, 1in. to 4in. broad, the apex acuminate, the edge entire or sub-repand, the base rounded or cuneate. *areolæ* eight to twelve between the midrib and edge. Mexico to Peru, 1793.

M. serratum (serrated). *sti.* 1ft. to 3ft. long, stout. *fronds* pinnate, 3ft. to 4ft. or more long, 1ft. or more broad; pinnæ 1in. to 3in. apart, 6in. to 12in. long, ¼in. to 2in. broad, oblong-lanceolate, the base cordate or cuneate, the apex acuminate, the edge finely toothed. *areolæ* twelve to twenty between the midrib and edge. Mexico to Peru. SYN. *M. palustre.*

FIG. 548. MENISCIUM SIMPLEX.

M. simplex (simple). *rhiz.* firm, wide-creeping. *sti.* stramineous, of the barren fronds 4in. to 6in., of the fertile 1ft. or more, long. *fronds* simple; barren ones 6in. to 9in. long, 2in. to 3in. broad, oblong-lanceolate, acuminate, the base cordate, and sometimes auricled, the edge crenate; fertile ones similar but smaller. *areolæ* eight to twelve between the midrib and edge. Chusan, Hong Kong, &c., 1850. See Fig. 548.

M. Thwaitesii (Thwaites'). *rhiz.* firm, wide-creeping. *sti.* 9in. to 12in. long, sub-stramineous, nearly naked. *fronds* 8in. to 10in. long, 4in. to 5in. broad, sub-deltoid; the apex acuminate, crenato-pinnatifid; below this several blunt, linear-oblong, sub-entire pinnæ, lowest largest, distinctly stalked, 2in. to 3in. long, ⅔in. broad, edge bluntly (not deeply) lobed; base narrowed suddenly. *areolæ* and *sori* four or five in the lower pinnæ between the midrib and edge. Ceylon.

M. triphyllum (three-leaved). *rhiz.* firm, wide-creeping. *sti.* slender, sub-stramineous, of the barren fronds 4in. to 6in., of the fertile fronds 1ft. or more, long. *fronds* with an oblong-lanceolate terminal pinna, 4in. to 6in. long, 1in. to 1½in. broad, the base cuneate or rounded, the edge repand, and one or two similar but smaller ones on each side, the fertile ones smaller than the barren ones. *areolæ* six to nine between the midrib and edge. Himalayas, &c., 1828.

MENISPERMACEÆ. An order of trailing (rarely erect) shrubs, broadly dispersed through most tropical regions. It belongs to Lindley's menispermal alliance of diclinous exogens. Flowers dicœcious, small, in a panicle, raceme, or cyme, rarely solitary, sometimes accompanied by cordate bracts. Leaves alternate, exstipulate, usually palminerved, entire or palmilobed or peltate, rarely compound (as in *Burasaia*); petiole spuriously jointed at the base, and sometimes at the top. The bark of several species of this family is extremely bitter; some yield a yellow dye. Beer is sometimes adulterated in England with *Cocculus indicus.* There are about thirty-one genera and 300 species. Examples are: *Cissampelos, Cocculus,* and *Menispermum.*

Menispermaceæ—*continued.*

MENISPERMUM (from *mene,* the moon, and *sperma,* a seed; in allusion to the shape of the seed). Moon Seed. ORD. *Menispermaceæ.* A genus comprising only two species of climbing deciduous shrubs, one of which is North American, and the other an inhabitant of Eastern Asia. Flowers greenish-white, small, paniculate. Drupe compressed. Leaves often sub-peltate, palmately lobed or angular. The under-mentioned species is a very handsome plant for damp and shady walls. Propagated by divisions of the root, or by cuttings, in spring.

M. canadense (Canadian). *fl.* yellowish, borne in profusion on long pendulous racemes. Summer. *l.* large, handsome, reniform, peltate. North America, 1691. (B. M. 1910.)

MENTHA (the old Latin name, borrowed from the Greek name *Minthe*). Mint. SYNS. *Audibertia* and *Pulegium.* ORD. *Labiatæ.* "... A natural genus, not numerous in species, but widely diffused over the greater part of the globe without the tropics, and most of the species, from the variety of situations to which they will adapt themselves, vary so much as to render their exact definition almost hopeless. Many of them also propagate so readily from suckers that individual specimens are perpetuated so as to assume the appearance of species. Almost all the species vary in the stamens" (Bentham). Whorls usually many-flowered, sometimes all remote in the axils of the leaves, sometimes approximate into terminal spikes, with the superior floral leaves bract-formed. Only a few of the species are worthy of cultivation. The dwarf evergreen kinds are readily increased by division of the plants in autumn and winter. For culture and uses of Spearmint and Peppermint, *see* **Mint.**

M. citrata (Citron-scented). Bergamot Mint. *fl.* reddish-purple, in round terminal heads. Summer. *l.* petiolate, ovate, broadly rounded at the base, or sub-cordate, glabrous. *h.* 1ft. Europe (Britain). SYN. *M. odorata.* (Sy. En. B. 1029.)

M. odorata (odorous). A synonym of *M. citrata.*

M. piperita (pepper). Peppermint. *fl.* purple; spikes loose, obtuse, short, interrupted at the base. Autumn. *l.* petiolate, ovate-oblong, acute, serrated, roundly crenated at the base, glabrous. Stem branched, reddish. *h.* 1ft. to 2ft. Europe (Britain). (B. M. Pl. 203.)

M. Pulegium (Pulegium). Pennyroyal. *fl.* pale purple; whorls all remote, globose, many-flowered. Autumn. *l.* petiolate, ovate. Stem much-branched, prostrate. Europe (Britain), North and West Asia, North Africa. (B. M. Pl. 201.) *See* **Pennyroyal.** The variety known as *M. P. gibraltarica* is largely employed in geometrical gardening. It has a dwarf, compact growth, and deep green foliage.

M. Requieni (Requien's). *fl.* pale purple, in loose, few-flowered whorls. Summer. *l.* petiolate, small, stalked, orbicular. Stems spreading at the base, much branched; branches filiform, ascending. Corsica, 1829. A pretty and minute creeping herb.

M. rotundifolia (round-leaved). *fl.* whitish, in dense, conically cylindrical spikes. Autumn. *l.* sessile, ovate-roundish, crenated, wrinkled, pubescently-hairy above, woolly beneath. Stem erect, panicled by a few branches at top. *h.* 1ft. to 2ft. Europe (Britain), North and West Asia, North Africa. (Sy. En. B. 1020.)

M. r. variegata (variegated). This variety is far more useful for horticultural purposes than the type. Its leaves are wrinkled on the upper surface, covered with a cobweb-like down underneath, and elegantly variegated with green and light yellow, which ultimately becomes darker.

M. viridis (green). Common Green Mint or Spearmint. *fl.* purplish; spikes cylindrical, loose; whorls approximate, or the lower ones or all distant. August. *l.* nearly sessile, ovate-lanceolate, unequally serrated, glabrous. Stem erect. *h.* 2ft. Europe (Britain). (B. M. Pl. 202.)

MENTZELIA (named after Christian Mentzel, 1622-1701, a German botanist). Including *Eucnide* and *Microsperma*. ORD. *Loaseæ*. A genus of half-hardy, annual, biennial, or perennial, herbaceous plants, found chiefly in Mexico, California, and the Southern United States. Flowers orange or white, solitary, racemose or cymose, opening only during sunshine. Leaves alternate or nearly opposite, coarsely toothed. For culture, &c., *see* **Bartonia** (which genus is now generally included under the present one).

FIG. 549. PORTION OF PLANT OF MENTZELIA BARTONIOIDES.

M. bartonioides (Bartonia-like).* *fl.* solitary, terminal; petals sulphur-yellow, paler, almost white beneath, ovate or rather obovate, slightly serrated, on long pedicels. Summer. *l.* ovate, acute, lobed and serrated. Stems about 1ft. long, flexuose, succulent, sub-translucent. Western United States, 1849. Annual. See Fig. 549. SYNS. *Eucnide bartonioides* and *Microsperma bartonioides* (B. M. 4491).

M. hispida (hairy). *fl.* yellow; petals obovate, mucronately acuminate, longer than the calyx; stamens numerous. June and July. *l.* nearly sessile. *h.* 1½ft. Mexico, 1820. Perennial. (B. M. 3205.)

Mentzelia—*continued.*

M. lævicaulis (smooth-stemmed). *fl.* bright yellow, from 2½in. to 3in. across, expanding only in the morning, and closing after noon. Summer. *h.* 2ft. California. Biennial.

M. oligosperma (few-seeded). *fl.* yellow; petals acuminate; peduncles axillary, solitary. May and June. *fr.* reflexed. Stem branched. *h.* 2ft. Louisiana, 1812. Perennial. (B. M. 1760.)

FIG. 550. UPPER PORTION OF PLANT OF MENTZELIA ORNATA.

M. ornata (adorned).* *fl.* white, large, odoriferous, expanding after sunset, and remaining closed up the whole of the day. July to September. Ovary leafy; seeds naked. *l.* hispid, glandular, laciniate. *h.* 2ft. Missouri, 1811. Annual. See Fig. 550. (B. M. 1487, under name of *Bartonia decapetala*.)

MENYANTHES (ancient name, from *men*, a month, and *anthos*, a flower; in allusion to the duration of the flower). Buckbean. ORD. *Gentianeæ*. A genus (two species) of very ornamental hardy perennial aquatics, natives of Arctic Europe, North Asia, North-west India, and North America. Flowers white or bluish, at the tops of the scapes, or in long, terminal, leafless, shortly racemose peduncles; corolla shortly funnel-shaped. Leaves alternate at base of stem, either trifoliolate or reniform, on long petioles, with scarious sheathing bases. Rootstocks long, thickish, creeping. The species are easily established, in shallow water or boggy situations, by divisions of the roots.

M. Crista-galli (cock's-comb). *fl.* in a simple or forked cyme; corolla white; tube not longer than the calyx; lobes naked, but with a medial crest. Spring. *l.* reniform, and sometimes emarginate, crenate, 2in. to 4in. wide; petioles and scape at length slender, and 1ft. to 2ft. high. North America. SYN. *Villarsia Cristagalli*.

M. trifoliata (three-leaved). Bogbean; common Buckbean; Marsh Trefoil. *fl.* white inside and reddish outside; anthers purplish, with the tips curved inwards; peduncles axillary. Spring. *l.* trifoliolate; leaflets ovate, obtuse. Stem procumbent, and covered by the sheaths of the leaves. Northern hemisphere (Britain). (Sy. En. B. 920.)

MENZIESIA (named after Archibald Menzies, 1754-1842, surgeon and naturalist to the expedition under Vancouver). ORD. *Ericaceæ*. A genus comprising seven species of hardy, Heath-like shrubs, natives of North America and Japan. Flowers white, greenish, or purple, in terminal corymbose fascicles, nodding or drooping; corolla cylindric-globose, urceolate or campanulate, obtusely four or five-lobed. Leaves alternate, petiolate,

Menziesia—*continued.*

obovate or elliptical, membranaceous, deciduous, entire, glabrous or pilose beneath. Branches sub-verticillate. The species are very ornamental subjects for rock gardens or borders, in a moist peaty soil. Propagated by carefully dividing established tufts, by cuttings, or by layers.

M. cærulea. *See* **Phyllodoce taxifolia.**

M. empetrifolia (Empetrum-leaved). A synonym of *Bryanthus empetriformis.*

M. ferruginea (rusty). *fl.* brown; corolla oblong-ovate, and becoming cylindrical; pedicels bristly-glandular. May. *l.* oblong or lanceolate-obovate, acutish at both ends, glandular-mucronate, rusty strigose-hirsute above, paler beneath. *h.* 6in. North America, 1811.

M. f. globularis (globular-flowered). *fl.* pink, drooping; corolla globose, with rounded lobes. May. *l.* ovate, clustered at the ends of the branches. *h.* 2ft. to 5ft. North America, 1806. (B. M. 1571, under name of *M. ferruginea* β.)

M. polifolia (Polium-leaved). A synonym of *Daboecia polifolia.*

MERCURIALIS (so named after Mercury, who is supposed to have discovered some virtues in the genus). Mercury. ORD. *Euphorbiaceæ.* A genus comprising half-a-dozen erect herbaceous plants, with small, green, dicœcious flowers, and opposite leaves. They are uninteresting weeds, widely distributed over the temperate regions of the globe. *M. perennis*, the Dog's Mercury, a native of Europe and North Africa, is a poisonous plant, which turns dull bluish-green when dried; and a deep blue dye, of a fugitive nature, may be obtained from it.

MERCURY. *See* **Mercurialis.**

MERENDERA (a name given to *Colchicum* by the Spaniards). ORD. *Liliaceæ.* A genus comprising ten species of pretty, hardy, bulbous plants, inhabiting the Mediterranean region, and extending thence to Abyssinia and Afghanistan. They are closely allied to *Colchicum*, but the flattened portion of each of the six perianth segments is abruptly contracted into a long, narrow claw, and is, at the point of contraction, furnished on each side with a small tooth. For culture, *see* **Colchicum.**

M. Aitchisoni (Aitchison's). A synonym of *M. persica.*

M. Bulbocodium (Bulbocodium).* *fl.* one or two; perianth segments rosy-lilac, lanceolate, sub-acute; stamens much shorter than the perianth; anthers yellow. Autumn. *l.* three, emerging after the flowers, at length linear, falcate, channelled. *h.* 3in. to 4in. Pyrenees and the mountains of Spain (Sierra Nevada) in the alpine regions. SYN. *Colchicum montanum.*

M. caucasica (Caucasian). *fl.* one to three from the same spathe; perianth segments, with long narrow claws, which meet and form a tube; lamina delicate rose-coloured, tinged with purple. May. *l.* three, narrow-lanceolate, obtuse, channelled, much-tapering at the base, shorter than the flowers. *h.* 3in. Caucasus, 1823. (B. M. 3690.)

M. c. Eichleri (Eichler's). This differs from the type in the inner segments being distinctly auriculated at the base. Eastern Caucasus. (R. G. 952.)

M. persica (Persian). *fl.* pale lilac, fragrant, 1½in. to 2in. in diameter, funnel-shaped; keel of perianth segments pale reddish. November. *l.* 1in. to 2in. long, ⅛in. broad, acute, concave, dark green, rather fleshy, lengthening to 6in. or 8in. Corm 1½in. long, flagon-shaped, with a long neck; tunic pale chestnut-brown. India, Persia, &c., 1872. (B. M. 6012, under name of *M. Aitchisoni.*)

MERIANIA (named in honour of a Dutch lady, Sibylle de Merian, 1647-1717, authoress of "De Metamorphosibus Insectorum Surinamensium"). SYN. *Davya.* ORD. *Melastomaceæ.* A genus comprising about twenty-six species of erect, glabrous or pubescent, stove trees or shrubs, natives of tropical America and the West Indies. Flowers yellow or purple, large, disposed in short, cymose, terminal or lateral panicles; calyx glabrous or powdery, tube shortly campanulate or hemispherical; stamens ten, equal or nearly so. Leaves often on long petioles, oblong-lanceolate, obtusely acuminate or caudate at apex, three to five-nerved, entire or obtusely toothed. For culture, *see* **Melastoma.**

M. Karstenii (Karsten's). *fl.* deep red. Summer. *l.* lanceolate, serrate, long-acuminate. Branches terete, smooth. Caraccas, 1850. Shrub. (F. d. S. 767.)

Meriania—*continued.*

M. rosea (rosy).* *fl.* varying from white with a crimson base to rose and purple; calyx lobes subulate; anther spurs short, alternately conical and bi-tubercled. *l.* elliptical or ovate-lanceolate, the younger ones minutely serrate with glandular teeth. *h.* 30ft. West Indies, 1885. An arborescent shrub.

MERISTOSTIGMA. A synonym of **Lapeyrousia** (which *see*).

MERODON CLAVIPES. *See* **Narcissus Fly.**

MERTENSIA (named in honour of Professor Francis Charles Mertens, 1764-1831, a German botanist). SYNS. *Casselia, Hippoglossum, Oreocharis*, and *Steenhammera.* ORD. *Borragineæ.* This genus comprises about fifteen species of very handsome, hardy, perennial, glabrous or pilose herbs, natives of Eastern Europe, extra-tropical Asia, and North America. Flowers blue or purplish, pedicellate, ebracteate; racemes terminal, or cymes loosely branched, few-flowered, unilateral, sometimes paniculate. Leaves alternate, often pellucid-dotted. The species are of very easy culture in ordinary garden soil; they form admirable subjects for mixed borders, copses, and rockwork. Propagated by divisions in autumn; or by seeds, sown as soon as ripe.

M. alpina (alpine).* *fl.* light blue, disposed in close, or at length loose, clusters, of which each stem bears from one to three. Spring and summer. *l.* bluish-green, oblong, somewhat spathulate or lanceolate, rather obtuse. *h.* 6in. to 10in. Rocky Mountains, 1875. A lovely little alpine.

M. alpina (alpine), of Hooker. A synonym of *M. lanceolata.*

FIG. 551. MERTENSIA DAHURICA, showing Habit and detached Flower.

M. dahurica (Dahurian). *fl.* bright azure-blue, drooping, in racemose panicles. June. *l.* ovate, roughish, slightly glaucous, and clothed with small decumbent hairs. Stems erect, branching, angular, furrowed, hairy. *h.* 6in. to 12in. Dahurica. A pretty species, with a very slender habit, and requiring a sheltered position. See Fig. 551. (B. M. 1743, under name of *Pulmonaria dahurica.*)

M. lanceolata (lanceolate).* *fl.* drooping; bracts leafy; calyx shorter than the corolla tube, five-cleft to the middle or lower; segments oblong and obtuse, or lanceolate and acute; corolla light or dark blue, with a cylindric tube; limb campanulate, very shortly five-lobed. May. *l.* sessile, chiefly cauline, linear-oblong or spathulate, radical often broader, acute or obtuse; upper surface smooth or muricate; margin ciliate. Stems simple, erect, slender. *h.* 6in. to 12in. Rocky Mountains, 1874. (B. M. 6178, under name of *M. alpina.*)

M. maritima (sea). Oyster Plant. *fl.* blue, erect, disposed in terminal corymbose racemes. July. *l.* ovate or oblong, acutish; the upper ones stem-clasping. Stems procumbent, branched. Northern coast regions of Northern hemisphere (Britain). SYN. *Pulmonaria maritima.* (Sy. En. B. 1099.)

M. paniculata (paniculate). *fl.* purplish-blue; corolla somewhat funnel-shaped, three or four times the length of the lanceolate-linear acute divisions of the calyx. July. *l.* ovate and ovate-lanceolate, taper-pointed, ribbed, thin. *h.* 1ft. to 2ft. North America. Plant erect, roughish, more or less hairy. (B. M. 2680 and B. R. 146, under name of *Pulmonaria paniculata.*)

M. sibirica (Siberian).* *fl.* purplish-blue, terminal, pedicellate, disposed in elongated, conjugate racemes, with a flower in the fork. May to July. *l.* rather fleshy, glabrous; radical ones cordate, roundish-obtuse, or broad-elliptic; cauline ones ovate,

Mertensia—*continued.*

acute. Stems erect, simple. *h.* 6in. to 18in. East Asia and North America, 1801. A very pretty species, varying in the colour of its flowers. SYN. *Pulmonaria sibirica.* There is a white-flowered form in cultivation.

FIG. 552. INFLORESCENCE AND DETACHED FLOWER OF MERTENSIA VIRGINICA.

M. virginica (Virginian).* Virginian Cowslip. *fl.* purple-blue, tubular, about 1in. long, disposed in gracefully-drooping terminal clusters. Spring and summer. *l.* lanceolate-ovate, lower ones 4in. to 6in. long, 2in. to 3in. broad, shortly stalked. *h.* 1ft. to 2ft. Virginia, 1799. See Fig. 552. (B. M. 160, under name of *Pulmonaria virginica.*)

MERTENSIA (of Willdenow). Included under *Gleichenia.*

MERULIUS LACRYMANS. This is often called the Dry-rot Fungus. It is the most frequent cause, though not the only one, of the form of decay in the woodwork of houses and of greenhouses commonly known as Dry-rot. The wood is traversed in every direction by the thread-like cells (mycelium) of the fungus; and the tissue is thereby so altered in its nature as to crumble readily on pressure. *Merulius* attracts moisture, and is constantly damp. It spreads over large surfaces in dark, ill-ventilated spaces, when in the spore-producing stage, and its surface (hymenium) is then marked with pores, or small tubes.

Remedies. The remedies employed for the attacks of this fungus (which, if unchecked, proves most destructive in houses, as it spreads rapidly) are, where possible, soaking the woodwork with strong solutions of corrosive sublimate, or of copper sulphate. Since well-dried or seasoned wood is far less liable to be attacked, such wood alone should be used in house-building. Good ventilation, to insure the dryness of the woodwork in the house, is an essential means for the prevention of Dry-rot.

MERYTA (said to be derived from *meryo,* to roll up; in reference to the male flowers forming something like a rolled-up ball). SYN. *Botryodendron.* ORD. *Araliaceæ.* A genus comprising six species of stove or greenhouse, glabrous trees, natives of Norfolk Island, New Zealand, and the South Pacific Islands. Flowers dicœcious, in panicled heads, at the sides of the branches, or in sessile fascicles; males small; females large. Leaves simple, large, entire or sinuated. For culture, *see* **Aralia.**

M. latifolia (broad-leaved). *fl.* greenish-yellow, male, female, and hermaphrodite, densely crowded into oblong compound heads, which are 2in. to 3in. long, formed of innumerable clusters of about six sessile flowers, on a thick green rachis. March. *l.* 2ft. to 3ft. long, crowded, narrow-obovate or fiddle-shaped; petiole short, stout. *h.* 50ft. to 60ft. Norfolk Island. Greenhouse. (B. M. 5932.)

M. sonchifolia (Sonchus-leaved). *l.* lyrate-pinnatisect; terminal lobe deltoid or somewhat acuminate; side lobes rhomboid-ovate, acute; margins irregularly toothed, dark green, marked with numerous whitish spots. Stem (and petioles) olive-green. New Caledonia, 1879. Stove. (I. H. 1879, 340.)

MESEMBRYANTHEMUM (from *mesembria,* midday, and *anthemon,* a flower; in reference to the flowers opening better on sunny days). Fig Marigold. ORD. *Ficoideæ.* A very extensive genus (about 300 species) of greenhouse, or rarely hardy, erect or prostrate, fleshy, leafy herbs or sub-shrubs, mostly natives of South Africa, a few being found in other parts of Africa, and in Australia, New Zealand, the Canary Islands, the Mediterranean region, and Arabia. Flowers white, yellow, or different shades of red, &c., conspicuous, axillary or terminal, cymose, paniculate, or corymbose; calyx tube adnate with the ovary; lobes five, rarely one to eight, unequal, herbaceous or scariose; petals many, one to many-seriate, inserted in the calyx tube, linear. Capsules tightly closed during dry weather, and opening naturally after rain (if placed in water until thoroughly soaked, and then removed, an old capsule will open out its carpellary valves, radiating from the centre, like a star, and will close them again when dry; this may be repeated several times without destroying its remarkable hygroscopic property). Leaves often opposite, thick, fleshy, very variable in shape, entire or furnished with spiny rigid hairs on the margins. The culture of most species of this genus is very simple, the great secret of success consisting in exposing the plants to the full sun at all times, and in not using too rich a soil. A compost of lime rubbish, yellow loam, sand, and decayed manure, in equal proportions, suits them well. Several species constitute very charming plants for window gardening, and many others can be grown with great success in the open from May until October. Propagation may be easily effected by pieces, pulled or cut off, and laid in the sun on moist sand, where they root freely in a few weeks. Except where otherwise stated, greenhouse treatment is required for the species here described.

Mesembryanthemum—*continued.*

FIG. 553. BRANCH AND DETACHED LEAF OF MESEMBRYANTHEMUM ACINACIFORME.

M. acinaciforme (scimitar-formed). *fl.* reddish, large, solitary, terminal. August. *l.* opposite, compressed, triquetrous, acinaciform, rather curled at the edges, and roughish. Stem rather procumbent, long. 1714. Evergreen trailer. SYN. *M. rubrocinctum.* See Fig. 553. (A. B. R. 508; B. M. 5539; M. A. S. § 19, Fig. 6.)

M. adscendens (ascending). *fl.* yellow, pedunculate. August. *l.* broadly tongue-shaped, very blunt, ascending, green. 1805. Plant stemless, herbaceous. (M. A. S. § 8, Fig. 4.)

M. agninum (lamb-chop). *fl.* yellow, sessile, solitary, central, expanding in the evening. May. *l.* semi-terete, serrulated from elevated dots, and hence somewhat toothed, with a large white pustule on the inside at the base. 1824. Plant almost stemless, canescent, wrinkled from dots, herbaceous. (M. A. S. § 5, Fig. 8.)

M. albidum (white-leaved). *fl.* golden-yellow, large, agreeably scented. June to August. *l.* greenish-white, subulate, triquetrous; apex obtuse, mucronate. *h.* 6in. 1714. Evergreen shrub. (B. M. 1824.)

M. albinatum (white-marked). *fl.* yellow, central, solitary, sessile. September. *l.* acinaciformly triquetrous upwards, with a recurved mucrone, full of scattered, rather elevated, whitish dots. *h.* 2in. 1823. Herbaceous.

Mesembryanthemum—*continued.*

M. aurantiacum (orange-coloured). *fl.* deep orange-colour, large, solitary. June to August. *l.* bluntly triquetrous, somewhat compressed, very glaucous; bracts semi-terete. Stem erect. *h.* 1ft. to 2ft. 1793. Shrub. (M. A. S. § 25, Fig. 2.)

M. aureum (golden). *fl.* bright orange, with yellow stamens and dark purplish pistils. February to May. *l.* cylindric-triquetrous, glaucous. *h.* 1ft. 1750. An upright evergreen shrub. (B. M. 262.)

M. australe (Southern). *fl.* pale pink, middle-sized; peduncles bluntly two-edged, bibracteate at the base. July. *l.* triquetrous, glaucescent, dotted, smooth, incurved. Stems semi-terete, creeping, shrubby. Australia, 1773. Evergreen. (M. A. S. § 18, Fig. 2.)

M. barbatum (bearded). *fl.* flesh-coloured; tubercles five, dark green within the flower. June to August. *l.* rather remote, spreading, ending in five or six radiating hairs at the apex. Stems erect; branches effusely procumbent. *h.* 6in. to 9in. 1705. Evergreen shrub. SYN. *M. stelligerum.* (B. M. 70; M. A. S. § 52, Fig. 1.)

M. bicolor (two-coloured). A synonym of *M. coccineum.*

M. blandum (charming).* *fl.* at first white, but at length pale rose or red, large; peduncles equal, longer than the bracts. June. *l.* compressed, triquetrous, crowded, narrow, acutish, smooth. Stems shrubby; branches numerous, compressed, ascending. *h.* 1ft. 1810. Evergreen. (B. R. 582; M. A. S. § 26, Fig. 1.)

M. Bolusii (Bolus'). *fl.*, petals yellow in their lower half, red in the upper, numerous, spreading over the tops of the plant. *l.* two, large, fleshy, trigonous, keeled, truncate, pale glaucous-green, dotted with dark green. 1883. (B. M. 6664.)

M. candens (glittering).* *fl.* white, terminal, solitary. June to August. *l.* cylindrical, incurved, canescent, glittering, obtuse. Branches long, weak, procumbent or prostrate. 1814. Evergreen trailer. (M. A. S. § 51, Fig. 4.)

M. caninum (dog). *fl.* yellowish-orange, opening after midday; peduncles longer than the leaves. August to October. *l.* glaucous, carinately-triquetrous, rather club-shaped, incurved towards the apex, and, as well as the bracts, somewhat toothed. 1717. Plant almost stemless, herbaceous. (M. A. S. § 5, Fig. 9.)

M. caulescens (caulescent). *fl.* red, fragrant, numerous, aggregate, small. May to July. *l.* much-crowded, glaucous, rather long, triquetrously deltoid, with the sides hardly toothed, and the keel entire. Stems erect, branched. *h.* 1½ft. 1731. Shrub. (M. A. S. § 30, Fig. 1.)

FIG. 554. MESEMBRYANTHEMUM COCCINEUM, showing Habit, detached Flower, and Portion of Branch, with Leaves.

M. coccineum (scarlet).* *fl.* scarlet, solitary; peduncles smooth at the base. May to September. *l.* teretely triquetrous, rather compressed, obtuse, glaucescent. Stems shrubby, erect. 1696. See Fig. 554. (L. B. C. 1033; M. A. S. § 46, Fig. 1; B. M. 59, under name of *M. bicolor.*)

M. conspicuum (conspicuous).* *fl.* of a beautiful red, pedunculate. Autumn. *l.* green, glittering in sunshine, triquetrous, and, as well as the branches, crowded. Floriferous stems erect. *h.* 1ft. 1806. Shrub. (M. A. S. § 27, Fig. 1.)

M. Cooperi (Cooper's).* *fl.* handsome purple, solitary, about 2in. in diameter. *l.* terete, glaucous, pointed, studded with papillæ. *h.* 3in. 1862. A much-branched decumbent herb. (B. M. 6312.)

M. corallifiorum (coral-flowered). *fl.* pink, solitary, showy. May. *l.* nearly terete, incurved, smooth, rather thicker in the middle, glaucous. Stems straight, much-branched. *h.* 1ft. 1820. Shrub. (M. A. S. § 40, Fig. 2.)

M. cordifolium (cordate-leaved). *fl.* red, solitary, terminal, or rather lateral, on the elongated branches. May to September. *l.* opposite, flat, petiolate, ovate-cordate, rather papulose. Stems

Mesembryanthemum—*continued.*

suffruticose, diffuse. 1774. Annual or biennial. (M. A. S. § 61, Fig. 1.)

M. c. variegatum (variegated).* *fl.* bright rosy-purple, sessile. *l.* flat, fleshy, small, cordate, distinctly margined with cream-colour. A very handsome little perennial; it forms a diffuse yellowish mass, entirely covering the surface of the ground, and is largely employed in bedding-out designs.

FIG. 555. MESEMBRYANTHEMUM CRINIFLORUM.

M. criniflorum (hairy-flowered), *fl.* pedunculate; petals purple, paler on the outside; stamens very short; calyx lobes five, unequal, larger ones oblong and contracted in the middle. July. *l.* opposite, cuneiform, flat, obtuse, rather scabrous from papulæ. Stems short, branched from the base, herbaceous. *h.* 6in. 1774. See Fig. 555. SYN. *M. cuneifolium.*

M. cruciatum (cross-leaved). *fl.* yellow, large, solitary; peduncles two-edged, 1in. to 2in. long. May to November. *l.* linear-tongue-shaped, semi-cylindrical, very soft, cruciate. 1792. Plant nearly stemless; old stems 3in. high. Herbaceous. (M. A. S. § 7, Fig. 7.)

M. crystallinum (crystalline).* Ice Plant. *fl.* white, axillary, almost sessile. May to August. *l.* ovate, sessile, alternate, stem-clasping, undulated. 1775. Plant diffusely procumbent, herbaceous, covered with large glittering papulæ on every part, which makes the plant appear as if covered with ice. Hardy annual. This species is sometimes grown for garnishing purposes. It is a most effective plant for the rockwork, and thrives in any moderately good soil, and in a sunny situation. Seeds should be sown in gentle heat, during March, and the seedlings planted out in the open in June.

M. cultratum (cultrate). *fl.* of a shining yellow above, and reddish beneath, large, solitary; peduncles compressed, rather longer than the flowers. Autumn. *l.* distichous, tongue-shaped, cultrate at the margin and apex, 3in. to 4in. long. *h.* 6in. 1820. Plant almost stemless, herbaceous. (M. A. S. § 8, Fig. 5.)

Mesembryanthemum—*continued.*

M. cuneifolium (wedge-shape-leaved). A synonym of *M. criniflorum.*

M. curtum (short-sheathed). *fl.* white, terminal, sub-paniculate. June. *l.* connate and sheathing at the base, usually approximate, incurved, smooth, green, with the angles rough at the top. Stem erect, bushy. *h.* 1ft. to 1½ft. Shrub. (M. A. S. § 36, Fig. 6.)

M. curvifolium (curved-leaved). *fl.* white, or ultimately rose, large; peduncles clavate, length of bracts. June. *l.* compressed, triquetrous, glaucescent. Stem shrubby; branches robust, terete. *h.* 2ft. to 3ft. 1818. Closely allied to *M. blandum.* (M. A. S. § 47, Fig. 2.)

FIG 556. FLOWERING BRANCH OF MESEMBRYANTHEMUM DELTOIDES.

M. deltoides (deltoid). *fl.* rose-coloured, sweet-scented, ternate or cymose. Summer. *l.* incurvate, erect, glaucous, trifariously toothed. An erect, shrubby species, with reddish-brown branches. See Fig. 556.

Mesembryanthemum—*continued.*

M. diversifolium (diverse-leaved). *fl.* yellowish-brown, striated by a red line on the outside, pedunculate. May. *l.* very long, triquetrously semi-cylindrical, rather recurved, green, crowded in heads. Stems prostrate, rather nodose; adult ones robust, angular, red and yellow. 1726. Shrubby. (M. A. S. § 15, Fig. 2.)

M. dolabriforme (hatchet-shaped). *fl.* yellow, fully expanding in the evening and night only. June. *l.* somewhat resembling a hatchet in shape, dotted. *h.* 6in. 1705. A free-flowering evergreen. (B. M. 32.)

M. echinatum (hedgehog). *fl.* yellow. August. *l.* oblong-ovate, filled, rather triquetrous, gibbous, ramentaceously echinated. Stems erect, branched. *h.* 3in. to 6in. 1774. Shrub. (M. A. S. § 53, Fig. 2.)

M. edule (edible).* Hottentot Fig. *fl.* yellow, large, solitary, terminal. July. *l.* equally triquetrous, dotless, a little channelled, attenuated at both ends, with the keel serrulated. Branches expanded, with quite entire angles. 1690. This prostrate shrub is nearly hardy in dry, sunny spots in the southern counties.

M. elegans (elegant). *fl.* reddish, pedunculate, middle-sized. May to October. *l.* rather triquetrous, very glaucous, scabrous. Stems suffruticose; branches decumbent, white. 1724. Shrub. SYN. *M. retroflexum.*

M. emarginatum (emarginate). *fl.* pale red, solitary; peduncles bibracteate. June *l.* triquetrous, scabrous, glaucescent. Stems suffruticose; branches expanded, filiform. *h.* 1ft. to 2ft. 1732. (M. A. S. § 48, Fig. 4.)

M. ermininum (ermine). *fl.* yellow, solitary, terminal, opening in the evening. May. *l.* triquetrous, wrinkled from large dots; margins with short teeth at the apex. *h.* 1½in. 1824. Plant almost stemless, glaucous. A densely-tufted herb. (M. A. S. § 5, Fig. 6.)

M. falciforme (sickle-shaped). *fl.* pink, terminal, solitary or ternate, expanding at midday, fragrant, pedunculate. *l.* in clusters, thick, falcate, acinaciform, glaucous, large-dotted. Stems sub-erect, flexuose, woody, rigid. *h.* 1½ft. 1805. Evergreen shrub. (M. A. S. § 29, Fig. 1.)

M. fastigiatum (fastigiate). *fl.* of a fulvous colour on the outside, whiter and paler on the inside, solitary, middle-sized. July to September. *l.* crowded, flexuously reflexed, subulate, semiterete, glaucescent. Stems slender, erect at first, but at length becoming decumbent. *h.* 1ft. 1794. Shrub. (M. A. S. § 44, Fig. 3.)

M. felinum (cat). *fl.* yellow, expanding after midday, sessile, solitary. August to November. *l.* 1½in. long, ciliated, with long teeth, obsoletely dotted, cartilaginously keeled at the apex, full of pellucid dots when examined by the light. 1730. Plant stemless, glaucescent, herbaceous. (M. A. S. § 5, Fig. 2.)

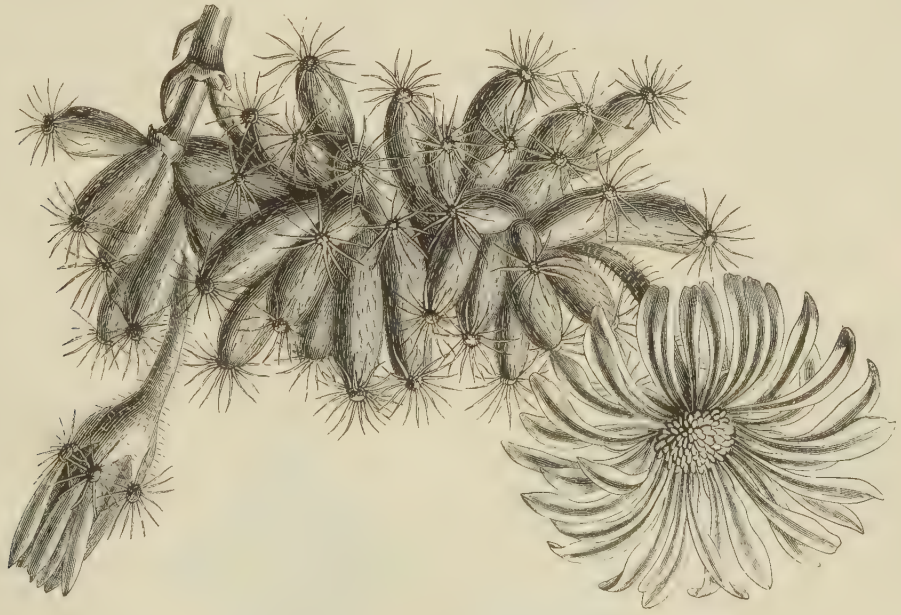


FIG. 557. MESEMBRYANTHEMUM DENSUM.

M. densum (dense).* *fl.* pink; peduncles hispid; calycine leaflets almost equal, twice as short as the petals. June. *l.* semi-cylindric, crowded with prickles at the apices. *h.* 3in. 1732. Evergreen trailer See Fig. 557. (B. M. 1220.)

M. depressum (depressed). *fl.* yellow, large, solitary, sessile. September. *l.* pale, narrow-tongue-shaped, obtuse, recurved, depressed, variously incurved at the apex. *h.* 1½ft. 1795. Plant almost stemless, prostrate, herbaceous. (M. A. S. § 8, Fig. 7.)

M. floribundum (bundle-flowered).* *fl.* pale red, with the petals white at the base, numerous, expanding before midday. May to October. *l.* almost cylindrical, somewhat incurved, papulose, obtuse. Stems suffruticose, bushy; branches spreading, very numerous. *h.* 6in. 1704. (M. A. S. § 51, Fig. 7.)

M. formosum (beautiful).* *fl.* purplish (filaments white), terminal.

Mesembryanthemum—*continued.*

disposed by threes, pedunculate. August. *l.* triquetrous, long, green, glittering in sunshine, much-crowded, but more remote on the branches. Stems suffruticose, dwarf. *h.* 1ft. 1820. (M. A. S. § 27, Fig. 4.)

M. fragrans (fragrant). *fl.* yellow, 3in. in diameter, fragrant, solitary, on a short peduncle. August. *l.* tongue-shaped, thick, one side rather convex and obtuse at the apex, the other side thrown out into a keel. *h.* 6in. Plant almost stemless, herbaceous. (M. A. S. § 8, Fig. 2.)

M. geminiflorum (twin-flowered). *fl.* pale pink, small, terminal. April and May. *l.* erect, spreading, triquetrous, glaucous, smooth, cartilaginous at the margins. Stems suffruticose, dwarf; branchlets dichotomous, ascending. *h.* 1ft. 1792. Evergreen.

M. glaucinum (bluish-grey). A synonym of *M. mutabile.*

M. grandiflorum (large-flowered). *fl.* yellow, almost scentless, large, sessile. July. *l.* broad tongue-shaped, long, thick, having a large pustule on the inside at the base. *h.* 3in. 1824. Plant herbaceous. (M. A. S. § 8, Fig. 3.)

M. hirtum (hairy). *fl.* of a bright purple, about 1½in. in diameter, terminal, usually solitary, sometimes two or three together. Summer. *l.* connate at base, sub-erect, recurving, linear, attenuate, both surfaces covered with minute glistening papillæ. Stems diffuse, procumbent, terete. *h.* 3in. 1862. Herbaceous. (G. C. n. s., x. p. 138.)

M. imbricans (imbricating). *fl.* red, pedunculate. May to October. *l.* linear, obsoletely triquetrous, smoothish, of a whitish-glaucous colour, imbricately crowded at the top of the canescent branches. Stems erect, shrubby. 1818.

M. imbricatum (imbricated). A synonym of *M. multiflorum.*

M. includens (never-closing).* *fl.* purplish-pink, scentless, always open; inner petals somewhat imbricated. June. *l.* dolabriform, green, tipped with red. Branches red. *h.* 1½ft. 1805. Evergreen shrub. The flowers of this plant are useful for cutting purposes, as they will last for several days. (A. B. R. 384.)

M. introrsum (introrse). *fl.* on long, slender, terminal peduncles; calyx tube turbinately hemispheric, obscurely obtusely angled, green; limb of five spreading and recurved segments; petals in two series, very various in colour, white, fading to rose, or ochreous or red. *l.* in distant pairs, somewhat recurved, semi-terete, with very rounded sides, tipped with brown bristles, connate at base, light green, fleshy. Stems branched from the base. South Africa, 1824. (B. M. 6057.)

FIG. 558. MESEMBRYANTHEMUM LINGUÆFORME.

M. linguæforme (tongue-formed). *fl.* yellow, solitary, on very short peduncles. March to November. *l.* unequally tongue-shaped, thick, green, keeled on one side. *h.* 6in. 1732. Plant stemless, herbaceous. See Fig. 558. (M. A. S. § 8, Fig. 8.)

M. lupinum (wolf). *fl.* yellow; petals two or three-seriate. Summer. *l.* glaucescent; marginal ciliæ very long and numerous. Plant stemless. Very closely allied to, and perhaps only a variety of, *M. felinum.* (M. A. S. § 5, Fig. 3.)

M. micans (glittering). *fl.* usually brownish-scarlet, with a golden-yellow centre, but varying in colour, pedunculate, 1½in. in diameter. July and August. *l.* sub-cylindric, and, as well as the flower-stalks, covered with conspicuous glittering particles. Stem erect. *h.* 2ft. to 3ft. 1704. Evergreen shrub. (B. M. 448.)

Mesembryanthemum—*continued.*

M. microphyllum (small-leaved). *fl.* reddish, small, solitary, on short peduncles. May. *l.* connate, triquetrous, acuminated, a little awned, green, dotted, pustulate on the inside at the base. Stems short, densely branched, decumbent. 1795. Shrub. (M. A. S. § 34, Fig. 2.)

M. minimum (smallest). *fl.* very pale yellow, almost white, solitary, sessile, central. September to December. *h.* ½in. 1776. Plant stemless, obconical, glaucescent, herbaceous, with confluent, rather branched, spots.

FIG. 559. MESEMBRYANTHEMUM MINUTUM.

M. minutum (minute).* *fl.* long, tubular; petals pale yellow in the free part, spreading; tube slender, ½in. long. September to November. 1795. Plant stemless, obconical, glaucous, hardly the size of a common bean, and without spots. Evergreen shrub. See Fig. 559. (B. M. 1376.)

M. molle (soft). *fl.* pale red, small, solitary, terminal. October. *l.* spreading, turgidly triquetrous, firm, canescent, the margins blunt, and lined with dots. Branches crowded, two-edged, decumbent. *h.* 1ft. 1774. Evergreen.

M. multiflorum (many-flowered).* *fl.* white, panicled, numerous, nearly 1in. in diameter; peduncles bracteate even to the calyx. July. *l.* connate and sheathing at the base, glaucous, remote, smooth, dotted, rather compressed, triquetrous. Stems and branches erect, sub-tetragonal. *h.* 2ft. to 3ft. 1792. Shrub. SYN. *M. imbricatum.* (M. A. S. § 37, Fig. 1.) There are three or four varieties of this species, including *minus*, *nitens*, and *patens.*

M. muricatum (muricated). *fl.* red, numerous, aggregate, small, fragrant. May. *l.* crowded, deltoid, glaucous, and, as well as the bracts and lobes of calyx, trifariously denticulated. Stem erect, branched. *h.* 1½ft. 1731. Shrub. (M. A. S. § 30, Fig. 3.)

M. murinum (mouse). *fl.* yellow, small, solitary, sessile. September. *l.* ciliately denticulated, three rows on each side, and full of tubercular dots, with the margin and keel ciliately denticulated at the apex. *h.* 1½in. 1790. Plant almost stemless, glaucous, herbaceous. (M. A. S. § 5, Fig. 4.)

FIG. 560. LEAFY SHOOT AND INFLORESCENCE OF MESEMBRYANTHEMUM MUTABILE.

Mesembryanthemum—*continued.*

M. mutabile (changeable). *fl.* reddish, solitary, on short pedicels. July to September. *l.* nearly distinct, crowded, triquetrous, dotted, with a cartilaginous, entire keel. Stems shrubby, erect, branched, two-edged. *h.* 1½ft. 1792. Shrub. SYN. *M. glaucinum.* See Fig. 560. (M. A. S. § 21, Fig. 3.)

M. nobile (noble). *fl.* yellow, scentless, large, sessile, opening before midday, bibracteate at the base. July. *l.* coarsely and triquetrously clavate, obtuse, somewhat recurved, rather concave above, marked by large elevated tubercles. *h.* 1½in. 1822. Plant rather caulescent, herbaceous. (M. A. S. § 4, Fig. 1.)

M. obcordellum (reversed-heart-shaped). *fl.* whitish, small, sessile. June. *h.* 1½in. 1794. Plant stemless, obconical, glaucescent, with confluent branched dots. Evergreen shrub. (B. M. 1647.)

M. octophyllum (eight-leaved). A synonym of *M. testiculatum.*

M. patulum (spreading). *fl.* pale red, solitary, pedunculate. June. *l.* compressed, triquetrous, very glaucous, attenuated at both ends, acinaciform. Stems suffruticose, erect. *h.* 1½ft. There are several varieties of this species.

M. polyanthum (many-flowered). *fl.* pale red, small, very numerous, panicled. August. *l.* small, glaucous, triquetrous, scabrous. Branches flexuous, crowded; bark on young stems rufous. *h.* 1ft. to 1½ft. 1803. Shrub.

M. polyphyllum (many-leaved). A synonym of *M. violaceum.*

FIG. 561. MESEMBRYANTHEMUM POMERIDIANUM, showing Habit and detached Flower.

M. pomeridianum (afternoon). *fl.* yellow, large, expanding after midday, solitary, on axillary, very long, hairy peduncles. July. *l.* broad-lanceolate, flat, smooth, ciliated, nearly distinct. Stems hairy, terete, branched. *h.* 1ft. 1774. A very pretty hardy annual. See Fig. 561. (B. M. 540; M. A. S. § 65, Fig. 1.)

M. pugioniforme (dagger-formed). *fl.* pale yellow, large; peduncles bracteate. July to September. *l.* alternate, crowded at the tips of the branches, glaucous, triquetrous. Stems erectish, suffruticose; branches few, terete, decumbent. *h.* 1ft. 1714. Shrub. See Fig. 562. (M. A. S. § 16, Fig. 4.)

M. purpureo-album (purple and white).* *fl.* showy; petals white, polished, naked, with a broad dark purple line; peduncles filiform. August. *l.* green, triquetrously semi-cylindrical, full of little dots; upper ones crowded. Branches short, angular, prostrate, furrowed, yellowish. 1824. Shrub. (M. A. S. § 15, Fig. 3.)

M. retroflexum (reflexed). A synonym of *M. elegans.*

M. Rossii (Ross'). *fl.* white at base, deep purple above, solitary, terminal, large, showy. Summer. *l.* acinaciform, or compressedly triquetrous, glaucescent, with red, smooth, cartilaginous edges. Stems decumbently prostrate. 1820. Shrub. (M. A. S. § 19, Fig. 2.)

M. rostratum (beaked). *fl.* yellow, expanding in the sun, solitary, pedunculate; bracts two, longer than the scape. *h.* 3in. 1742. Plant stemless, herbaceous. (M. A. S. § 3, Fig. 7.)

M. rubrocinctum (red-girded). A synonym of *M. acinaciforme.*

M. Salmii (Salm-Dyck's). *fl.* yellow, large, sessile. September to November. *l.* decussate, semi-cylindrical, attenuate and acute at the apex, or oblique and bluntish. *h.* 6in. 1820. Plant nearly stemless, herbaceous. (M. A. S. § 7, Fig. 8.)

M. serratulum (serrate). *fl.* yellow, with purple lines, ternately disposed, solitary. November and December. *l.* sub-connate, triquetrous, subulate, elongate, dotted, serrated at the angles or only at the keel, and rather glaucous, usually longer than the internodes, with the margins minutely serrulated, but hardly

Mesembryanthemum—*continued.*

cartilaginous. Stems shrubby, when young erect; branches erectly decumbent. 1795.

M. setuliferum (bristly). *fl.* bright violaceous, solitary in the forkings of the branches; peduncle slender, 1½in. to 2in. long. June. *l.* usually rather distant, sub-cylindrical, blunt, covered with setuliferous papillæ, ending in a tuft of from seven to sixteen flexuose, white, radiating hairs. Stems branching diffusely; branches procumbent, 1ft. or more long. 1876. Shrub.

FIG. 562. MESEMBRYANTHEMUM PUGIONIFORME, showing Flowering Branch and Immature Capsule.

M. spectabile (showy).* *fl.* of a beautiful red, 2in. in diameter. May to August. *l.* glaucous, triquetrous, and, as well as the branches, crowded. Stems rather dwarf; floriferous ones ascending or erect. *h.* 1ft. 1787. Shrub. (B. M. 396; M. A. S. § 27, Fig. 3.)

M. stelligerum (star-bearing). A synonym of *M. barbatum.*

M. stipulaceum (stipuled). *fl.* light red, paler on the under side, 2in. in diameter, solitary. May. *l.* teretely triquetrous, long, subulate, incurved, glaucous, full of pellucid dots, margined at the base. Stems shrubby, and, as well as the branches, erect. *h.* 1ft. 1723. (M. A. S. § 40, Fig. 3.)

M. striatum (striped). *fl.* reddish, with a deeper-coloured line in the middle, expanding before noon; peduncles hispid. May to October. *l.* semi-cylindrical, subulate, papulose. Stems erect. *h.* 9in. 1727. Shrub. (M. A. S. § 51, Fig. 1.)

M. subulatum (subulate). *fl.*, petals white, with a purple midrib, solitary, pedicellate. June. *l.* rather glaucous, triquetrously subulate, denticulated at the apex. Stems branched. Plant herbaceous.

M. sulcatum (furrowed). *fl.* white, spotted with rose, middle-sized, solitary. August. *l.* crowded, linear-subulate, semi-terete,

Mesembryanthemum—*continued.*

channelled, pale green, adult ones expanded. Stems shrubby, erect. *h.* 2ft. 1819. (M. A. S. § 44, Fig. 1.)

M. Sutherlandi (Sutherland's). *fl.* lilac, with a yellow centre, 2in. to 2½in. broad. Summer. *l.* oblong-lanceolate, recurved, scaberulous at the edge. *h.* 3in. 1870. (B. M. 6299.)

M. tenuifolium (slender-leaved). *fl.* copper-red, solitary; peduncles elongated, naked. June to September. *l.* semi-terete, rather compressed, subulate, green, glabrous, longer than the internodes. Stems shrubby, erectish. *h.* 1ft. 1700. (M. A. S. § 46, Fig. 6.)

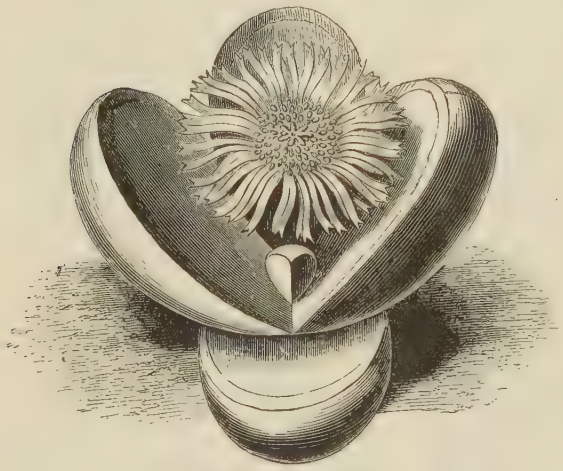


FIG. 563. MESEMBRYANTHEMUM TESTICULATUM.

M. testiculatum (testiculated). *fl.* yellow, nearly 1in. in diameter; calyx six-cleft, with two leaf-bracts at base. November. *l.* six to eight, white, smooth, rather erect, convex beneath, flat above. *h.* 1½in. 1819. Plant stemless, shrubby. SYN. *M. octophyllum.* See Fig. 563. (B. M. 1573)

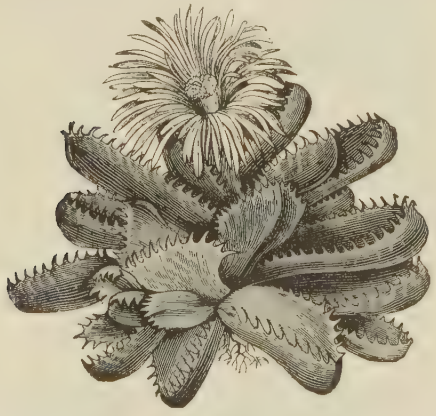


FIG. 564. MESEMBRYANTHEMUM TIGRINUM.

M. tigrinum (tiger). *fl.* yellow, expanding after noon, large, central, sessile. September to November. *l.* stem-clasping, ovate-cordate, expanded, marbled with white, flat above, ciliated with long hairs, cartilaginously keeled at the apex. *h.* 3in. 1790. Plant stemless, greenish, herbaceous. See Fig. 564. (B. R. 260; M. A. S. § 5, Fig. 1.)

M. tricolorum (three-coloured).* *fl.* large, shining, pedunculate; petals straw-coloured, blood-coloured at the base. April. *l.* exactly cylindrical, acute, green. Stems prostrate; branches distant. 1794. See Fig. 565. (M. A. S. § 15, Fig. 7.)

M. truncatellum (truncate). *fl.* solitary, sessile; calyx tube sunk and tightly wedged between the two uppermost leaves, the limb five or six-cleft, the lobes obtuse, tinged purple; petals straw-coloured, in two series; stamens numerous; anthers yellow. October. *l.* very fleshy, broadly cuneate, connate to above the middle; back and face convex; crown lunate, brown, mottled, convex. 1795. Plant forming tufts of pale glaucous-green, obconic, truncate, translucent, fleshy masses. (B. M. 6077.)

Mesembryanthemum—*continued.*

M. uncinatum (hooked-leaved). *fl.* red, middle-sized, solitary. August. *l.* connate, and sheathing at the base, rather decurrent, green, dotted, triquetrous, furnished with two spines underneath at the apex. Stems shrubby, erect. *h.* 1ft. to 2ft. 1725. (M. A. S. § 33, Fig. 3.)

M. vaginatum (sheathed). *fl.* white, small, panicled, numerous. July. *l.* spreading, straight, remote, triquetrous, rather recurved at the apex, and, as well as the sheaths, green and glabrous, but with the angles rough near the top. Stems erect, bushy. *h.* 1½ft. 1882. Shrub. (M. A. S. § 36, Fig. 4.)

M. variabile (variable). *fl.* yellow, at length becoming reddish, solitary, pedunculate, expanding in the morning. July. *l.* somewhat triquetrous, compressed, glaucous, scabrous. Stems shrubby, effuse, rather decumbent. *h.* 1½ft. 1796. (M. A. S. § 46, Fig. 2.)

FIG. 565. MESEMBRYANTHEMUM TRICOLORUM, showing Habit, and Unopened and Fully-expanded Flowers.

M. violaceum (violaceous).* *fl.* flesh-coloured to violet, expanding in the heat of the sun; peduncles one-flowered, naked or bracteate at the very base. June to October. *l.* triquetrously semi-terete, rough from dots, acute, glaucous. Stems shrubby, erect; branches violaceous, expanded. *h.* 1ft. to 2ft. 1820. SYN. *M. polyphyllum.* (M. A. S. § 48, Fig. 3.)

M. viridiflorum (green-flowered). *fl.* greenish; petals very narrow; calyx hairy. July to November. *l.* semi-terete, beset with papulose hairs. Branches diffuse. *h.* 1ft. to 2ft. 1774. Shrub. (B. M. 326.)

M. vittatum (striped). *fl.* bright shining yellow, paler on the back, with a narrow red line down the centre on both sides; peduncle one-flowered, bibracteate at the base. November. *l.* connate at the base, erect, lanceolate, acute, mucronate. Plant sub-acaulescent, cæspitose, forming dense tufts, 1½in. to 2in. high. 1877.

MESEMBRYEÆ. A tribe of *Ficoideæ.*

MESOCHLÆNA. Included under *Didymochlæna.*

MESOCLASTES. A synonym of **Luisia** (which *see*).

MESOSPINIDIUM. Now included, by Bentham and Hooker, under **Odontoglossum** (which *see*).

MESPILUS (from the old Greek name *Mespilos*, used by Theophrastus). Medlar. ORD. *Rosaceæ.* A small genus of hardy deciduous trees, now included, by Bentham and Hooker, under *Pyrus.* Flowers large, nearly sessile usually solitary; petals nearly orbicular. Pome turbinate, open, five-celled. Leaves undivided, shortly stalked, lanceolate or oblong, slightly toothed or lobed. For culture, &c., *see* **Medlar.**

M. acuminata (acuminate). A synonym of *Cotoneaster acuminata.*

M. Amelanchier (Amelanchier). A synonym of *Amelanchier vulgaris.* Frequently met with in gardens under the name of Snowy Mespilus.

M. Cotoneaster (Cotoneaster). A synonym of *Cotoneaster vulgaris.*

Mespilus—*continued.*

FIG. 566. FRUITING BRANCH OF MESPILUS GERMANICA.

M. germanica (German).* Common Medlar. *fl.* white, solitary. May. *l.* lanceolate, undivided, a little downy, but most so underneath. *h.* 10ft. to 20ft. Europe (Britain), Asia Minor, Persia. See Fig. 566. (Sy. En. B. 478.) There are several varieties of this species. *See* **Medlar.**

M. grandiflora (large-flowered). A synonym of *M. Smithii.*

M. parvifolia (small-leaved). A synonym of *Cratægus parvifolia.*

M. Smithii (Smith's).* *fl.* white, usually solitary, one-half the size of those of the common Medlar. May and June. *l.* oblong-elliptic, serrated, pubescent on the nerves beneath; stipules of the sterile branches large and foliaceous. *h.* 20ft. Caucasus. SYN. *M. grandiflora* (S. E. B. 18).

MESUA (named after two celebrated Arabian physicians and botanists, Mesue, who flourished at Damascus in the eighth and ninth centuries). ORD. *Guttiferæ.* A small genus (about half-a-dozen species) of stove evergreen shrubs or trees, natives of tropical Asia. Flowers large, axillary, solitary. Leaves narrow, very slender, crowded, elegantly marked with numerous parallel veins, diverging from the midribs. The undermentioned species thrives in a loam and peat compost. Propagated by cuttings of half-ripened shoots, placed in sand, with slight bottom heat, in May; or by seeds, sown in heat, during March or April.

M. ferrea (iron-wooded). *fl.* white, about the size of those of the Sweetbriar, very fragrant, stalked, axillary. July and August. *l.* elliptical-lanceolate, acute, glaucous beneath. *h.* 40ft. India, 1837. An exceedingly ornamental hard-wooded tree, the deep yellow stamens contrasting finely with the white corolla.

METAXYA. Included under *Cyathea.*

METHONICA. A synonym of **Gloriosa** (which *see*).

METRODOREA (named after Metrodorus, a painter, who, according to Pliny, was the first to illustrate plants by figures). ORD. *Rutaceæ.* A monotypic genus, the species being a stove shrub, thriving best in a compost of loam and peat. Propagated by cuttings, placed under a bell glass, in heat.

M. atropurpurea (dark purple). *fl.* purplish, glandular, small, borne on panicles. *l.* opposite, entire, stalked, dotted. *h.* 5ft. Brazil, 1851. The proper name of this plant is, according to Bentham and Hooker's classification, *Esenbeckia atropurpurea.* (F. d. S. 337.)

METROSIDEROS (from *metra*, the heart of a tree, and *sideros*, iron; referring to the hardness of the wood). Ironwood. ORD. *Myrtaceæ.* This genus comprises about eighteen species of greenhouse, evergreen, glabrous or hoary-tomentose, rarely scandent, trees or shrubs, inhabiting the Pacific Islands, from New Zealand to the Sandwich Isles, one being found in the Indian

Metrosideros—*continued.*

Archipelago, one in tropical Australia, and one in South Africa. Flowers often showy, in dense, di- or trichotomous, terminal or rarely axillary, cymes; calyx tube campanulate, funnel-shaped, or urceolate; segments five, loosely imbricated; petals five, spreading. Leaves opposite or some rarely alternate, penniveined. The undermentioned species are all from New Zealand. For culture, *see* **Melaleuca.**

M. buxifolia (Box-leaved). A synonym of *M. scandens.*

M. florida (flowery). A synonym of *M. robusta.*

M. robusta (robust). *fl.* red, disposed in a terminal thyrse. May. *l.* opposite, obovate-oblong, glabrous, veiny. *h.* 5ft. 1845. Shrub. (B. M. 4471, under name of *M. florida.*)

M. scandens (climbing).* *fl.* white, almost sessile. August. *l.* sessile, ovate, slightly hoary beneath. *h.* 4ft. or 5ft. in pots, but in its native forests climbing to the summits of the loftiest trees. 1845. (B. M. 4515, under name of *M. buxifolia.*)

M. speciosa (showy). A synonym of *Callistemon speciosus.*

M. tomentosa (tomentose).* *fl.* rich crimson, large, in terminal, many-flowered, lax or dense cymes, thickly pubescent. July. *l.* decussate, petiolate, 1in. to 3in. long, varying from linear-lanceolate to oblong or orbicular-oblong. *h.* 30ft. to 40ft. 1840. Tree. (B. M. 4488.

METROXYLON (from *metra*, the heart of a tree, and *xylon*, wood; in allusion to the large proportion of pith contained in the plant). SYN. *Sagus* (in part). ORD. *Palmeæ.* A genus comprising about half-a-dozen species of erect stove palms, natives of the Malayan Archipelago, New Guinea, and the Fiji Islands. Spadix large, loosely paniculate-branched; spathe coriaceous, aculeate; floriferous branchlets alternate, elongated, erect, recurved. Fruit ellipsoid or sub-globose, one-seeded. Leaves terminal, sub-erect, equally pinnatisect; segments opposite, linear-lanceolate, acuminate; the costa setose beneath; margins at base recurved. The sago of commerce is prepared from the trunks of *M. læve* and *M. Rumphii.* The species described below succeeds best in sandy loam, and requires a strong, moist heat. Propagation may be effected by seeds, or by suckers.

M. vitiense (Viti or Fiji). *l.* pinnate, with segments about 1in. broad; petiole, lower portion particularly, beset with scattered long slender prickles.

METTERNICHIA (named after an Austrian Prince Metternich, 1772-1859). ORD. *Solanaceæ.* A genus comprising only a couple of species of handsome, glabrous, stove, evergreen trees, in habit similar to *Brunfelsia*; one is a native of Brazil, and the other inhabits Columbia. Flowers showy, shortly pedicellate, solitary, or a few at the apices of the branches; calyx campanulate, four to six-fid; corolla funnel-shaped; limb five or six-lobed. Leaves entire, somewhat shining, scarcely coriaceous. For culture, *see* **Lisianthus.**

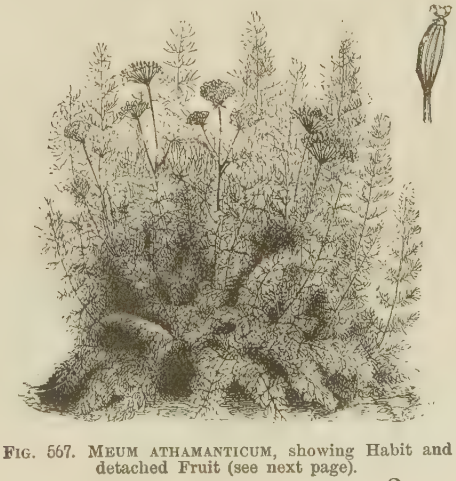


FIG. 567. MEUM ATHAMANTICUM, showing Habit and detached Fruit (see next page).

Metternichia—*continued.*

M. Principis (Prince Metternich-Winneburg's). *fl.* white, in terminal racemes; corolla funnel-shaped, with a limb of five equal segments. August. *l.* deep green. *h.* 3ft. Brazil, 1854. A neat and handsome compact-growing plant. (B. M. 4747.)

MEUM (from *Meon*, the old Greek name used by Dioscorides). Bawd-money. ORD. *Umbelliferæ*. A monotypic genus, the species being an elegant, hardy, aromatic, tufted, glabrous, perennial. It thrives in borders, on banks, and in the rock garden, in almost any ordinary soil. Propagated by divisions.

M. athamanticum (Athamanta-like).* Spignel. *fl.* white, in rather large, compound, terminal umbels; involucre, when present, of a few linear leaves, often altogether wanting. May. *fr.* narrow, but not beaked, with the primary ridges winged. *l.* much divided into numerous thread-like segments. Stems leafy, channelled, slightly branched. *h.* 1ft. to 2ft. Mountains of Western Europe (Britain). See Fig. 567, page 361. (Sy. En. B. 606.)

MEXICAN TEA. *See* **Chenopodium ambrosioides.**

MEXICAN THISTLE. A common name of *Cnicus conspicuus.*

MEXICAN TIGER FLOWER. *See* **Tigridia.**

MEYENIA (of Nees). Included under **Thunbergia** (which *see*).

MEYENIA (of Schlechtendal). Included under *Cestrum.*

MEZEREON. *See* **Daphne Mezereum.**

MICE. These animals are at times very troublesome in gardens, eating bulbs, roots, seeds, and the bark of trees; and occasionally they destroy numbers of trees by eating through or round the trunks, just below the surface of the ground. There are two kinds especially hurtful in gardens, viz., the Short-tailed Field Mouse, or Vole (*Arvicola arvalis*), and the Long-tailed Field Mouse (*Mus sylvaticus*). Both are very common, but the former prefers the drier, the latter the damper, places. They are readily distinguished by the tail, which, in the Vole, scarcely reaches one-fourth the length of the body, and is blunt at the tip; while the tail of the other is long, and tapers to the tip. The Vole has also a rounder head, with shorter ears, and its fur has a redder tinge than that of the Long-tailed Mouse. The Voles make runs among the grass of Lawns, &c., but they are not very easily caught. The most effective method of lessening their numbers has been found to be making pitfalls, 1ft. at least in depth, 4in. to 6in. wide at the mouth, and considerably wider at the bottom. Into these the Mice fall, and from them they cannot climb out. An inverted flower-pot sunk in the ground is sometimes used instead of the pit. Traps of various kinds may also be used, such as the Figure of 4 trap, or wire traps. The same means may be used to capture the other species, and poison may be employed with success where its use would not be dangerous to children or to domestic animals. One of the best poisons for Mice is phosphorus, made up with lard and flour. This may be scattered on the seed beds, or beside bulbs or other things that are endangered by the Mice. Other poisons employed for killing Mice are nux vomica or strychnine, arsenic, and white hellebore; but these are all dangerous to use for this purpose. Among natural enemies to Mice out of doors, owls, hawks, weasels, and their allies, are very helpful to gardeners, and should be protected by them whenever possible, whatever gamekeepers' views may be in regard to damage done by them among game. It is said that Mice may be prevented from proving injurious in seed beds by covering the soil, seedlings, and plants, with an inch of fine coal ashes. The mice, it is supposed, will not dig through this substance, which, at the same time, shelters the plants.

MICHAELMAS DAISY. *See* **Aster.**

MICHAUXIA (named after André Michaux, 1746-1802, a French botanist). ORD. *Campanulaceæ*. A small genus (four species have been described) of handsome hardy biennial plants, allied to *Campanula*, but having the recesses or sinuses of the calyx covered, and the leaves lyrate. Corolla rotate, with eight reflexed divisions. Leaves irregularly toothed or lobed, cauline few. Michauxias are very effective plants for borders, and thrive in warm, sheltered spots. Increased by sowing seeds, in April, on a warm, sunny border.

M. campanuloides (Campanula-like). *fl.* white, tinged with purple on the outside, drooping, scattered along the branches and stem, from the axils of the bracts. Summer. *l.* strigose, radical ones lanceolate, irregularly lobed; petioles margined and lobed. Stem branched at top. *h.* 3ft. to 8ft. Levant, 1787. (B. M. 219.)

M. lævigata (smooth).* *fl.* scattered along nearly the whole length of the stem, on short peduncles; calyx segments acute, at first erect, afterwards spreading at right angles; corolla white, much longer than the calyx, ten-parted; anthers yellow; pollen yellow. August. *l.* sprinkled on both sides with harsh, erect hairs, duplicate-dentate, coarsely-veined and reticulate; root leaves ovate; stem ones sessile. Stem 11ft. high, herbaceous, smooth, shining, upright, straight. North Persia, 1829. The whole plant yields, on the slightest injury, a quantity of milky juice. (B. M. 3128.)

MICHELIA (named after Pietro Antonio Michele, 1679-1737, a celebrated Florentine botanist). ORD. *Magnoliaceæ*. A genus comprising twelve species of stove evergreen trees, closely allied to *Magnolia*, natives of India and the islands of the Eastern Archipelago. Flowers axillary, solitary, or in one species terminal, usually smaller than in *Magnolia*. Michelias thrive in a compost of sandy loam and leaf mould. Propagated, in summer, by cuttings of half-ripened shoots, placed in sand, under a glass, in heat.

M. Champaca (Champaca). *fl.* yellow, large, not unlike a double Narcissus, sweet-scented throughout the day, but becoming rather fœtid at night; peduncles short, axillary, one-flowered; produced throughout the year. *l.* ovate-oblong, acuminated, acute at the base, with the ribs beneath, as well as the peduncles and spathes, silky. *h.* 30ft. to 40ft. India and Java, 1779.

M. lanuginosa (woolly). *fl.* pale yellow. Spring. *l.* drooping, elliptic-lanceolate, acuminate, bright green above, paler beneath. Himalayas, 1865. (B. M. 6179.)

MICONIA (named after D. Micon, a Spanish botanist). Including *Chitonia* (of Don), *Diplochita*, and *Tamonea*. (of Aublet). ORD. *Melastomaceæ*. A vast genus (about 300 species) of stove, polymorphous shrubs and trees, natives of tropical America and Asia. Flowers white, pink, red, purple, or yellow, in terminal or rarely lateral, corymbose panicles, pedicellate or sessile; calyx glabrous, furfuraceous, tomentose, or rarely setose; tube often adherent with the ovary; petals four to eight, obovate or oblong, spreading or reflexed. Berry two or many-seeded. Leaves frequently petiolate, entire, denticulate, or serrulate. A few of the species are cultivated for the sake of their foliage, those described below being the best known. For culture, *see* **Melastoma.**

M. nammea (flame-coloured).* *l.* very large, glossy, but rugose from the sunken veins, thin-ribbed, elliptic, acuminate, with the blade partially decurrent on the petiole. Stem erect, clothed with close rusty hairs. A handsome foliage plant.

M. Hookeriana (Hooker's).* *l.* deep olive-green, with broad silvery midrib, elliptic, rugose. A fine ornamental-leaved shrub. Peru. (B. M. 5411, under name of *M. pulverulenta.*)

M. H. trifasciata (three-banded). *fl.* white, small, in terminal panicles. *l.* elliptic, acute, with the three ribs silvery. Branches, leaves, and panicles velvety-tomentose. Eastern Peru.

M. pulverulenta (powdery). A synonym of *M. Hookeriana.*

M. Teysmanniana (Teysmann's). *l.* elliptic-ovate, five-nerved, metallic green. Malayan Archipelago, 1867. (R. G. 537.)

MICRANDRA. A synonym of **Hevea** (which *see*).

MICRANTHELLA. Included under **Pleroma** (which *see*).

MICROCACHRYS (from *mikros*, small, and *kachrys*, a cone; referring to the very small cones). ORD. *Coniferæ*. A monotypic genus. The species is a prostrate, much-branched, greenhouse evergreen shrub, confined to the mountains of Tasmania. For culture, see **Dacrydium.**

Microcachrys—*continued.*

FIG. 568. FRUITING BRANCH OF MICROCACHRYS TETRAGONA.

M. tetragona (four-sided).* Strawberry-fruited Cypress of Tasmania. *l.* deep green, ovate, extremely small, in four rows, closely imbricated. Tasmania, 1857. The "Gardener's Chronicle" describes this species as quite a gem among conifers. The female plant is very pretty, having nearly every one of its multitude of little branchlets terminated by a bright red, almost globular, fleshy cone, measuring about ¼in. from base to apex. By training up a leader, the lateral branches arrange themselves in a drooping manner round about. SYN. *Dacrydium tetragonum.* See Fig. 568. (B. M. 5576.)

MICROCALIA. A synonym of **Lagenophora** (which *see*).

MICROGASTER. A genus of parasitic insects belonging to the *Braconidæ*, a family of Ichneumons, very rich in species. They are all of small size, seldom exceeding ⅛in. in length, and ¼in. in spread of wings. The body-colours are almost always black, red, or yellow; the legs are usually paler, at times almost white. The ovipositor is usually short, and is often hardly visible. The wings are transparent, and show few cross-veins and cells. Some of the *Braconidæ* in the larval state live in the bodies of aphides; others live in the bodies of caterpillars of butterflies and of moths. To this latter group belongs the genus *Microgaster.* The most noticeable species is *M. glomeratus*, which is very helpful to gardeners, because of the number of caterpillars of the White Cabbage Butterfly it destroys. The larvæ live on the fat of the caterpillars, usually many in each individual; and, till full fed, they do not seem greatly to interfere with the growth of their hosts, as they do not attack any vital organs of the latter. But, when mature, the parasitic larvæ eat their way through the skin of their hosts, and each proceeds to spin a small oval, yellow, silken cocoon. These cocoons are frequently grouped in masses of nearly 1in. across, on the dying or dead caterpillars, and must have often been observed by every gardener. The perfect flies have the body deep black, with very short, white hairs; the belly and legs yellow; and the four wings transparent, and covered with short hairs. *See also* **Ichneumon Flies.**

Microgaster—*continued.*

MICROGLOSSA (from *mikros*, small, and *glossa*, a tongue; alluding to the shortness of the straps of the ray-flowers). SYN. *Frivaldia.* ORD. *Compositæ.* This genus comprises about six species of shrubs, inhabiting, for the most part, the warmer regions of Asia and Africa. Flower-heads small; disk pale-coloured; ray white or pale blue. Leaves alternate, ovate or lanceolate, entire. *M. albescens*, probably the only species yet introduced, is a hardy shrubby perennial, thriving in almost any soil. Propagated by seeds, or by division of the roots.

M. albescens (whitish).* *fl.-heads* pale blue or whitish, Aster-like, small, numerous, in terminal corymbs. *l.* alternate, lanceolate, acuminate. Himalayas, 1883. A very handsome and floriferous plant. SYN. *Aster albescens.* (B. M. 6672.)

MICROGONIUM. *See* **Trichomanes.**

MICROGRAMME. *See* **Polypodium.**

MICROLEPIA. Included under **Davallia** (which *see*).

MICROLICIA (from *mikros*, small, and *olikos*, in general; in allusion to the generally dwarf habit of the plants). ORD. *Melastomaceæ.* A genus consisting of a large number of species (of which seventy-seven are regarded, by Bentham and Hooker, as distinct) of small erect stove shrubs. Flowers solitary, axillary, or at the tips of the branchlets, sessile or shortly pedunculate; calyx lobes five; petals obovate. Leaves small, often imbricated, entire, serrated, or crenulated, often gland-dotted. The species have little or no horticultural value.

MICROLOMA (from *mikros*, small, and *loma*, a fringe; in reference to the fascicles of hairs in the tube of the corolla). ORD. *Asclepiadeæ.* A genus comprising about five species of greenhouse evergreen twining sub-shrubs, natives of the Cape of Good Hope. Flowers red, in interpetiolar umbels; corolla urceolate, with a ventricose angular tube, a naked throat, and a short limb. Leaves opposite, often narrow. For culture, *see* **Ceropegia.**

M. linearе (linear). *fl.* blood-coloured; limb of corolla very blunt. July. *l.* linear, glabrous, with reflexed margins. 1823.

M. sagittatum (sagittate). *fl.* scarlet; limb of corolla very blunt. July. *l.* sagittate, sub-tomentose, linear-hastate, shortly petiolate; margins reflexed. 1775.

MICROMERIA (from *mikros*, small, and *meris*, a part; referring to the usually diminutive flowers). SYNS. *Piperella, Sabbatia* (of Mœnch), and *Tendana.* ORD. *Labiatæ.* A genus comprising about sixty species of hardy or half-hardy sub-shrubs or herbs, dispersed over nearly all the temperate and warmer parts of the globe, but occurring in the greatest abundance in the Mediterranean region. Flowers purplish or white, generally small; whorls axillary or spicate, rarely cyme-formed, sub-panicled. Leaves opposite. With few exceptions, the species are of no horticultural value. *M. Piperella* is a pretty little rock plant. It thrives in any common garden soil, and may be increased by cuttings.

M. Piperella (Piperella).* *fl.*, fascicles few-flowered, the common peduncle nearly as long as the floral leaves; calyx tubular, pubescent, thirteen-ribbed; teeth subulate; throat hairy within; corolla pubescent, twice the length of the calyx. August to October. *l.* ovate, sometimes cordate at the base. *h.* 3in. South-west Europe. Half-hardy sub-shrub. (Fl. Ment. 32.)

MICROMYRTUS (from *mikros*, small, and *Myrtos*, Myrtle; small Myrtles). ORD. *Myrtaceæ.* A genus comprising six species of Heath-like, glabrous, greenhouse shrubs, confined to Australia. Flowers white or pink, small, solitary, and shortly pedicellate or almost sessile in the axils of the leaves; petals five, obovate or orbicular.

Micromyrtus—*continued.*

Leaves opposite, small, entire. Probably the species described below is the only one yet introduced. It requires similar treatment to that recommended for **Myrtus** (which *see*).

M. microphylla (small-leaved). *fl.* white, small, nearly sessile in the upper axils, usually forming little racemes on the smaller branches; petals spreading, persistent or deciduous. 1870. Habit erect or diffuse and much-branched.

MICROSORIUM. The plants formerly referred here are now divided, by Hooker and Baker, between **Nephrodium** and **Polypodium** (which *see*).

MICROSPERMA. Included under **Mentzelia** (which *see*).

MICROSTAPHYLA. Included under *Acrostichum.*

MICROSTEPHIUM. Included under *Cryptostemma.*

MICROSTYLIS (from *mikros*, small, and *stylos*, a column; in allusion to the size of the column). SYNS. *Achroanthes*, *Crepidium*, *Pedilea*, *Pterochilus*. ORD. *Orchideæ*. A genus comprising about forty species of stove terrestrial orchids, natives of Europe, Asia, and North and South America. They are allied to *Malaxis*, but distinguished from that genus by the lip being at right angles with the column. Flowers small, usually greenish or yellow. Leaves membranaceous or plicate. For culture, *see* **Liparis.**

M. calophylla (beautiful-leaved).* *fl.* yellow; peduncles rather strong, bearing a raceme about 6in. long. *l.* ovate, yellowish-green, prettily bordered, striped with brown. Pseudo-bulb conical. Indian Archipelago, 1879.

M. chlorophrys (green-leaved). *fl.* purple, with the ears of the sagittate lip ochre-coloured; racemes few-flowered. *l.* oblong, acute, greenish above, and light purple beneath. Borneo, 1881.

M. discolor (two-coloured).* *fl.* yellow, changing to orange, small, on short upright peduncles. *l.* deep reddish-purple, edged with green, plaited longitudinally, and much crisped at the margin. Ceylon, 1863. This species is characterised as among the most lovely of terrestrial orchids. The flowers, though minute, exhibit great singularity of structure when seen under the microscope. (B. M. 5403.)

M. histionantha (sail-flowered). *fl.* brownish-green, in a compact concave umbel; sepals reflexed, oblong; petals minute; column short, with obtuse horns. *l.* two from a broad-ovate or rounded tuber, ovate and membranaceous, with their sheathing bases forming a long tube around the base of the much-angled scape. Columbia. (B. M. 4103.)

M. Josephiana (Sir Joseph Hooker's). *fl.* yellow, small, disposed in terminal racemes. May. *l.* broadly ovate, greenish-brown. Pseudo-bulbs oblong. *h.* 1ft. Sikkim, 1877. (B. M. 6325.)

M. metallica (metallic).* *fl.*, odd sepal yellow, lateral sepals one side rose, the other yellow; petals light rose; peduncle violet, with a long raceme of numerous, rather long-stalked, blossoms. *l.* oblong-acute, of a light rose underneath, blackish-purple above, with an exquisite metallic lustre. Pseudo-bulbs cylindrical. Borneo, 1879.

M. ventilabrum (large-lipped). *fl.* yellow, with a large square lip, sagittate at the base, and seven to nine-toothed at top. *l.* light green, with brownish-tinted veins. Sunda Isles, 1882. A fine species.

M. versicolor (various-coloured). *fl.* various-coloured. June to October. *l.* ovate-lanceolate. *h.* 1ft. China, 1830. (L. B. C. 1751.)

MIDRIB. The middle vein of a leaf, which passes from the petiole to the apex.

MIGNONETTE (*Reseda odorata*). This well-known fragrant little plant is one of the most popular subjects in gardens of every description. Even persons limited to the space of a window-sill may grow some in summer, either in a box or in pots, provided the situation is not too hot. Mignonette does not succeed so well when exposed to heat as it does if kept comparatively cool, the tendency, under the former conditions, being to produce seeds, and this renders the flowering period a short one. It is most largely cultivated from seed, but healthy cuttings may be readily rooted if it is desired to perpetuate any specially good form or variety. Outdoor culture in summer is of the simplest description. Seeds should be sown thinly, in shallow drills, or in any other way desired, during April and May, and be lightly covered

Mignonette—*continued.*

with soil. When the young plants appear, and are large enough to handle, they should be thinned out, as this induces a much stronger growth in those left. These plants will flower in June and the two following months. Another later sowing should be made about July, for producing an autumn supply. Mignonette prefers a rich, rather heavy soil, and a cool, moist situation. If sown in poor, light ground, and in a position exposed to hot sunshine, the seeds possibly will not grow at all, or, if they do, the plants will be far inferior to those which can be treated more in accordance with their requirements. Watering must be freely practised throughout the summer, especially if the weather be more than usually dry. The flowers of Mignonette are amongst the most useful for cutting, as the racemes last so long in water, and emit an agreeable perfume.

Culture in Pots. Mignonette is most extensively cultivated in pots for winter and spring decoration of greenhouses, rooms, &c., its requirements being more fully met, as previously stated, by the cooler temperature then experienced. Tall standard plants are preferred by some cultivators, and seeds for their production are sown in small pots soon after midsummer, or sometimes long previous to this. The best plant in each pot is selected and grown on in an upright direction, the other smaller ones being removed at an early stage. Repotting may be practised as growth proceeds, until 8in. or 9in. pots are reached, if very large plants are desired. Careful training and watering are most necessary, as the shoots are very brittle, and, although the roots generally require plenty of water, anything approaching stagnancy is fatal. Mignonette is far more useful, and is extensively cultivated, for spring flowering in 5in. or 6in. pots. Seeds for the supply should be sown in the latter part of August, and again for a succession in September, using the pots wherein they are intended to grow and flower. The compost used should consist of about two parts loam, one of dried cow manure, and another of old sifted mortar rubbish. The latter ingredient is a most important one for this plant, and the addition of a little soot is also beneficial. All the pots used should be clean, dry, and properly drained. It does not matter how hard the compost is packed into them, provided it is united in a solid mass, and not rammed in layers. A few seeds should be distributed evenly over the surface, and lightly covered with a little sifted soil, similar to that of the bulk. The pots should then be watered, and placed in a shallow, cold frame, on a bottom of coal ashes, where they may remain until October, plenty of air being admitted in the meantime, and the plants thinned to about 1in. apart, when they are large enough to select the best. For winter quarters, the best place is a shelf near the glass in any light, airy house where such plants as Carnations, Bouvardias, &c., are grown, and a temperature of 50deg. to 55deg., with ventilation, is maintained. Failing such provision for Mignonette in houses, it is better to make the best of frames than to subject the plants to a high temperature, or close atmosphere — both most destructive to their well-being, and the prime causes of failure. Each plant must be provided with a small stick before it gets large enough to fall about, and from five to eight will be plenty for the size of pots above-mentioned. Water should only be sparely applied in winter, but never entirely withheld. As the days lengthen, the plants will start into growth freely, and then water may be given in abundance, even to the use of saucers in spring. When the flowers begin to expand, a little artificial manure, mixed with its bulk of dry loam, should be applied to the soil's surface, about once a week. This will materially assist in developing and lengthening the racemes.

Seed Saving. When Mignonette is only required for outside cultivation, or for cutting, it is not of so much importance whether the variety or strain represents its true characters or not, provided the plants are

Mignonette—*continued.*

floriferous and the flowers sweetly scented. For pot culture, it is most desirable that they should be of a vigorous yet compact habit, and of a uniform strength throughout. If several varieties are grown near each other, the flowers will be almost certain to become cross-fertilised by insect agency, and the product will always degenerate rather than improve. Distinct and superior forms often owe their origin to a rigid selection being annually made of the very best plants for seed-bearing, and the weeding out before the flowering period of all showing the least inferiority. Nurserymen, doubtless, do all in their power to retail seeds true to character; but whenever pot culture of Mignonette is practised, and a good type is once obtained, the cultivator should rigidly weed out, from the first, plants of irregular growth, and save seed himself from the others, sufficient, at least, for growing in pots the following year. The standard of quality would be much improved, even in one season, by such a selection, and far less "weeding" would be required afterwards. The seed must be collected so soon as it begins turning brown, and laid out on paper, in a cool, airy room or shed, to dry, when it may be rubbed out, cleaned, and stored in paper bags. If allowed to get quite ripe before being collected, the best seeds will be lost, in consequence of the seed-vessels

FIG. 569. RIPE SEED-VESSEL OF MIGNONETTE.

(see Fig. 569) being always open at the apex, and naturally situated at an angle well suited for readily discharging their contents.

Varieties. Of these, there are several in cultivation, some having what are termed red, and others white, flowers. The old common type of Mignonette is well known, and is one of the most sweetly scented. The following is a selection from the best varieties. There is a double-flowered form in cultivation, which must be propagated from cuttings.

Crimson King. Flowers bright red, sweetly scented; habit dwarf, vigorous, pyramidal. A new and distinct variety, most desirable for pot culture.

Dwarf Erect. Flowers erect, produced in stout, densely-set racemes; habit dwarf and neat.

Garaway's White. Flowers white; racemes large and long. One of the best, either for outside culture or for pots.

Giant Pyramidal. Flowers reddish, sweetly-scented; racemes very large. The plant is of a stout pyramidal habit, and succeeds well outside.

Golden Queen. Flowers golden-yellow, very distinct; habit dwarf and compact. An exceedingly fine Mignonette, of dense growth, very floriferous.

Machet. A new dwarf variety, of French origin, having very fragrant flowers of a bright red colour. The habit is robust, and the racemes broad. Highly recommended for pot culture.

Miles' Hybrid Spiral. Flowers white, very fragrant, produced in dense racemes, sometimes exceeding 1ft. in length. The habit is dwarf and branching, and the variety, when obtained true, is one of the best in cultivation, especially for pots.

Parsons' White. Flowers nearly white, strongly scented; racemes long and well-formed. An excellent variety.

Queen Victoria. Flowers deep red, very fragrant, profuse; habit dwarf, branching. Fine and distinct.

MIKANIA (named after Joseph Mikan, 1743-1814, one Professor of Botany at Prague). SYN. *Willugbœya.* ORD. *Compositæ.* A large genus (about sixty species have been described) of stove, evergreen climbers, natives, for the most part, of tropical America, allied to *Eupatorium*, but distinguished in the flower-heads containing generally only four florets, and the involucre having as many nearly equal bracts. For culture, *see* stove species of **Eupatorium.**

Mikania—*continued.*

M. apiifolia (Apium-leaved). *fl.-heads* yellowish, small, in lax corymbs. Summer. *l.* dark green, quinate, membranaceous, glabrous, evergreen; segments entire or pinnatifid. Brazil. A pretty climber. (I. H. 1885, 549.)

M. Guaco (Guaco). *fl.-heads* pale blue. *l.* stalked, ovate, subacuminate, remotely toothed. South America, 1823. Climbing perennial.

M. scandens (climbing).* *fl.-heads* yellowish-white, cylindrical, corymbose. Summer. *l.* opposite, cordate, glabrous, shining. Brazil, 1823. This slender climbing perennial is very suitable for growing over trellises, and similar places, in the open air, during the summer months.

MILDEW. A name sometimes applied to several kinds of microscopic fungi that live as parasites on various flowering plants, cultivated and uncultivated; it is, of course, on the former that their occurrence is of interest to the horticulturist. The name is believed to be connected with the German Mehl-thau, or Meal-dew, because of the appearance some Mildews give the affected parts of being sprinkled with flour or meal. Besides living on plants, the Mildews are also found on cloth, on paper, on leather, and even on glass; but the forms growing on these need not be further adverted to here. Nor is it necessary to dwell upon the Mildew of Wheat, Barley, and other grasses, which, if forming dark brown spots, is caused by a species of *Puccinia* (usually *P. graminis*); or, if the spots are orange, by the uredospores of the same fungi. The Mildews of most consequence in gardens are white, and form a coat all over the leaves and young shoots of the plants attacked by them. On microscopic inspection, this is found to consist of slender, creeping threads, which branch freely, and give off branches that rise erect into the air as slender filaments, made up of a single row of cells, of which the terminal ones are larger, oval, and break away from the tip backwards, to form spores, which serve for the reproduction of the fungi. Very many plants are liable to be attacked by this white coating, and there is reason to believe that there are many kinds of it, though all much alike. The various kinds are included, as species, under the genus *Oidium*; but they are known to be merely a stage in development of more highly developed fungi, belonging to *Erisypheæ*. If some kinds of *Oidium, e.g.*, those on Peas, on Hops, or on Roses, are watched, it will be found that, after a time, the surface becomes studded with small, yellowish objects, which soon grow darker in colour, and at length become quite black, and resemble grains of gunpowder, scattered abundantly over the *Oidium*. With the microscope these are seen to be fruits of the fungus. Each is a slightly-flattened sphere, with a thin, black wall, formed of cells (perithecium) surrounding several small transparent bladders (asci), each of which incloses two, four, or eight (rarely six) spores. These are believed to be the result of sexual reproduction. They are very small, and are easily carried about by the wind, or by other means. If they fall on a suitable host-plant, they push out a fine thread, which reproduces the *Oidium* stage once more. The threads of the *Oidium* lie on the outer surface of the plants (not penetrating among the cells, like the Potato Disease fungus, and many others), where they form a web, nourished by means of small branches (haustoria, or suckers), that penetrate into the outer cells (epiderm) of the plant, and absorb food from the cell contents. Some kinds of *Oidium* have not yet been traced to the sexually mature form, *e.g.*, *Oidium Tuckeri*, which is often very hurtful to Vines; *O. Balsamii*, on Turnip leaves, &c. Besides these two, the following White Mildews, of which the fully-developed state is known, are, at times, destructive to garden plants: *Sphærotheca pannosa*, in dense, grey patches, on Peach and Rose twigs and leaves; *S. Castagnei*, very injurious to Hops, as well as to many weeds; *Podosphæra Oxyacanthæ* on Hawthorn twigs and leaves; *Erisyphe Martii* on Peas, and other leguminous plants, and on many weeds; *E. communis* and *E. Cicho-*

Mildew—*continued.*

racearum, on various flowers; *Microsphæra Berberidis*, on Barberry leaves; *M. Grossulariæ*, on Gooseberry bushes; and *Phyllactinia suffulta*, on many trees and shrubs.

Remedies. White Mildews, caused by *Oidium*, being the only kinds that directly concern horticulturists to any extent, the present remarks are restricted to these. As the parasites are external to the host-plants, they can be attacked directly, and can be eradicated without much injury to the latter. Sulphur has proved to be the most reliable means of destroying the fungus. Flowers of sulphur may be dusted over the leaves and other diseased parts; or it may be applied with a syringe, if mixed in water. If applied to bunches of grapes, the sulphur must, of course, be washed off before they are sent to the table or the market. Another useful application is prepared by boiling 1lb. of flowers of sulphur and 1lb. of quicklime, in five pints of water, in an earthen pot, for ten minutes. It should be constantly stirred while it is boiling, then allowed to settle, and the clear liquid poured off for use. The plants should be syringed with a mixture of this preparation with 100 times its bulk of water. Washing the greenhouse flues with a mixture of ½lb. each of flowers of sulphur and of quicklime, in three gallons of water, is also recommended. The fumes emitted under this treatment kill the fungus. The door of the house should be kept closed for about an hour, to retain the fumes, and then the place should be well aired. Ewing's Mildew Composition, much diluted (1oz. to 1 gallon of tepid water), is used with the syringe, and is also very effective. Mildew is apt to prove most destructive in ill-ventilated situations, and it may often be checked, or even prevented by attention to ventilation.

MILFOIL. *See* **Achillea.**

MILKMAID, GOLDEN. *See* **Ilex Aquifolium aurea picta latifolia.**

MILK VETCH. *See* **Astragalus.**

MILKWORT. *See* **Polygala vulgaris.**

MILKWORT, SEA. *See* **Glaux.**

MILLA (named after J. Milla, a gardener to the Spanish Court, in Madrid). ORD. *Liliaceæ*. A monotypic genus. The species is a hardy bulbous plant. It thrives well when placed in sunny spots in the open border, in good, well-drained, loamy soil. Propagated by seeds, or by offsets.

M. biflora (two-flowered).* *fl.* umbellate (in natural state solitary, or often twin); perianth snowy-white inside, greenish outside, salver-shaped; tube elongate-campanulate; limb flat, six-parted. August, continuing a long time in succession, and remaining open at night. *l.* cylindrical, subulate at apex, fistulose, glaucous, almost equal with the scape. *h.* 6in. Mexico. (B. R. 1555; F. d. S. 1459.)

M. hyacinthina (Hyacinth-like). A synonym of *Brodiæa lactea.*

M. ixioides (Ixia-like). A synonym of *Calliprora lutea.*

MILLETTIA (named after J. A. Millet, a French botanist of the eighteenth century). SYN. *Benebera.* ORD. *Leguminosæ*. A genus comprising about forty species of sometimes tall, climbing trees or shrubs, of which one inhabits Australia, and the rest the warmer parts of Asia or Africa. Flowers purple, pink, or whitish; racemes terminal, or at the apices of the branches, paniculate; standard ample, spreading or reflexed. Leaves impari-pinnate; leaflets often evergreen, penniveined and reticulate veined, and, for the most part, stipulate. The species described below is probably the only one yet introduced. For culture, *see* **Dolichos.**

M. megasperma (large-seeded).* *fl.* purple, in loose panicled racemes. *l.* pinnate, glabrous, glossy, dark green. Queensland, &c. A handsome, evergreen, woody climber, with the habit of *Wistaria sinensis.* (B. M. 6541.)

MILLINGTONIA (named after Thomas Millington, an English botanist of the eighteenth century, and a writer on vegetable physiology). ORD. *Bignoniaceæ.*

Millingtonia—*continued.*

A monotypic genus, the species being a handsome stove evergreen tree, with deeply cracked and spongy bark. For culture, *see* **Jacaranda.**

M. hortensis (garden). *fl.* pure white, delightfully fragrant, numerous, large; corolla with a very long tube, divided into five segments, the two uppermost of which are more or less grown together; panicle cross-armed, ramifications horizontal, the first trichotomous, then dichotomous, with generally a simple flower in the fork. *fr.* divided into two cells by means of a partition running parallel with the direction of the valves. *l.* opposite, impari-pinnate; leaflets quite entire, 1in. to 3in. long. *h.* 80ft. Birma, 1820. (B. F. S. 249.)

MILLIPEDES (*Chilognatha*). This group of *Myriapoda* is of greater importance to gardeners, and demands fuller consideration here, than their allies the Centipedes. Millipedes are usually nearly cylindrical

FIG. 570. MILLIPEDE.

(see Fig. 570), less often a good deal depressed and flattened, and the origins of the legs are usually brought very close to the middle line of the body below, instead of being rather widely separated. The legs are thus hidden from view below the body in the living animal; they are also short and individually weak, but are very numerous, though very far below the number indicated by the name Millipede, or Thousand-feet. The three rings immediately behind the head each bear one pair of legs; but each of the rings behind these seems, at first sight, to bear two pairs of legs. This is due to the rings of the abdomen becoming tightly joined together two and two, while the limbs remain useful for movement, and fully formed. The last pair are not enlarged or noticeable, as in the Centipedes. As in the former group, so in the Millipedes, the only kinds met with here are small, seldom, if ever, surpassing 2in. in length; but, among the species of warmer lands, many kinds are upwards of 6in. long, and are stout in proportion to their length. Almost all of this group are in the habit, when disturbed, of curling up the body into a spiral, so as to protect the head, with its various organs, from injury. The Millipedes do not possess poison-tubes. They feed, in great part, on decaying vegetable tissues, and they may frequently be met with among dead leaves and other rubbish. In gardens, they may often be found under, or in, flower-pots; and they do damage, at times, to the potted plants, as well as to fleshy roots and tubers in the soil, and to fallen fruits, or to Strawberries. Occasionally they also injure germinating seeds of various cultivated plants, such as Beans, Turnips, &c. It may, at times, be found necessary to diminish their numbers where they are very plentiful. The most hurtful kinds are found to be *Julus guttulatus*, *J. terrestris*, and *Polydesmus complanatus*—the last-named being the flattened Millipede so abundant everywhere.

Remedies. These are seldom pressingly required. Deep trenching tends to lessen any superabundance. Traps may be used, in the form of pieces of carrot, or fallen fruits, laid on the soil. These should be frequently examined, and the Millipedes on them destroyed.

MILTITZIA. A synonym of **Emmenanthe** (which *see*).

MILTONIA (named after Viscount Milton, afterwards Earl Fitzwilliam). ORD. *Orchideæ*. A genus comprising about a score species of very beautiful, epiphytal orchids, with showy flowers. They are, with the exception of one from Peru, all Brazilian, and are allied to *Oncidium* and *Odontoglossum*, but distinguished from both by the short column. Flowers large; sepals and petals alike; lip undivided, sessile, continuous with the column, marked with interrupted lines near its

Miltonia—*continued.*

base; column short, with two auricles; scapes radical, few-flowered. Leaves narrow, flat. The species are dwarf in habit, somewhat rapid growers, and profuse blossomers. As a general rule, amateurs are rarely successful in getting foliage beyond a sickly yellow colour—a drawback which precludes the more extensive culture of these plants. Miltonias can be grown with green leaves and yet produce an abundance of blossoms; but it is not in every orchid house that just the right accommodation can be supplied. The plants like exposure to the light; but, in order to prevent the leaves turning yellow by the action of the sun, a certain amount of shade is necessary. They require an intermediate temperature and an abundant supply of water, the result of which will be green foliage and plenty of flowers. Some species, such as *M. spectabilis*, do well in a pan suspended from the roof of the house. These plants should not at any season be allowed to suffer from drought; indeed, they must never be kept dry. The pans should be thoroughly drained, and the plants potted in a compost of half-chopped sphagnum and good peat, to which may be added, with considerable advantage, some medium-sized lumps of charcoal. Miltonias should be kept in the Brazilian house when growing; and in winter, when at rest, they should be removed to the Cattleya house. Propagated by dividing the pseudo-bulbs, when they commence growth.

FIG. 571. MILTONIA PHALÆNOPSIS.

Miltonia—*continued.*

M. anceps (two-edged). *fl.* dark olive, about 2in. in diameter; lip streaked and dotted with reddish-purple, on a white ground. July. 1851. (B. M. 5572.)

M. Bluntii (Blunt's). *fl.*, sepals and petals whitish-yellow, with some large purple-cinnamon blotches, chiefly in their centre; lip white, with a purple area at the base. 1879. An elegant species.

M. candida (white).* *fl.*, sepals and petals yellowish, spotted with rich brown; lip white, tinged with rosy-pink, remarkably undulated or wavy; scape radical, five or six-flowered. Autumn. Pseudo-bulbs ovate, bearing upon the summit two narrow, light green leaves. *h.* 9in. 1830. A strong, erect-growing species, and one of the handsomest of the genus. Two forms occur in cultivation: in *grandiflora*, the flowers are larger and brighter, with the column purple and the lip white; in *flavescens* (B. M. 3793), both column and lip are yellowish.

M. Clowesii (Clowes').* *fl.* about 3in. across; sepals and petals thick, spreading, ground colour yellow, barred and blotched with rich brown; lip flat, cordate, of a rich purple at the base, and white at the tip; scape erect, many-flowered. Autumn. Pseudo-bulbs ovate, bearing long, sword-shaped, light green leaves. 1840. A very beautiful and remarkably distinct erect-growing plant. (B. M. 4109.) The variety *major* differs from the type only in its larger size and more showy blossoms.

M. C. Lamarcheana (Mons. Oscar Lamarche de Rossius'). A synonym of *M. Lamarcheana*.

M. cuneata (wedge-lipped).* *fl.* nearly 4in. in diameter; sepals and petals dark chocolate, tipped, and sometimes transversely barred, with tawny yellowish-green; lip pure white, tinged with pink near the base, differing in form from that of *M. candida* in being much more narrowed to the base, and scarcely curled at the margin; scape erect, four or five-flowered. Early summer. Pseudo-bulbs somewhat conical. *h.* 1ft. 1843. An erect-growing species, well deserving more general attention than it now

Miltonia—*continued.*

receives; although not so showy as several others, it is, nevertheless a handsome plant. (I. H. vii. 237.)

M. Endresii (Señor Endres'). *fl.* creamy-white, each petal having a rose-coloured blotch at its base; sepals also with smaller blotches at the base; lip pandurate, dilated, four-lobed; scape slender, five-flowered. *l.* linear-ligulate, acute. Pseudobulbs oblong, one-leaved. A difficult plant to grow, and now rare in cultivation. As there already was a *Miltonia Warscewiczii*, it has been necessary to give another specific name. Señor Endres was the first to introduce the species in a living state to this country. (B. M. 6163, under name of *Odontoglossum Warscewiczii*.)

Miltonia—*continued.*

M. festiva (gay). *fl.*, sepals and petals ochre-coloured, narrow; lip large, pointed in front, purplish-lilac, with radiating streaks of deep purple; peduncles two-flowered. 1868. A very showy species, resembling *M. spectabilis* in growth and general appearance.

M. flavescens (yellowish).* *fl.*, sepals and petals yellow, linear lanceolate, acuminate; lip sessile, yellow, spotted with blood colour; bracts straw-colour, glumaceous, over 2in. long, scarcely shorter than the flowers. June. *l.*, primordial ones short, linear-oblong; perfect ones linear-ensiform, obtuse, apiculate, pale green. Rhizomes creeping. 1830. (B. R. 1627, under name of *Cyrtochilum flavescens*.)

FIG. 573. MILTONIA VEXILLARIA.

Miltonia—*continued.*

FIG. 572. FLOWER OF MILTONIA SPECTABILIS.

M. Lamarcheana (Mons. Oscar Lamarche de Rossius').* *fl.*, sepals and petals yellow, with broad cinnamon bars; lip cordate at base, abruptly broader from the middle; base with an obscure globular tumour; front part with seven keels, whitish-ochre, with a broad, pandurate blotch before the keels. 1881. This species is closely allied to *M. candida*. (B. H. 1876, 13, under name of *M. Clowesii Lamarcheana*.)

M. Phalænopsis (Phalænopsis).* *fl.*, sepals and petals pure white, about 2in. across; lip white, with a large portion of the centre rich purplish-crimson, and a yellow base; spike slender, from one to three-flowered, shorter than the leaves. May. *l.* slender, grass-like, pale green or glaucous. Pseudo-bulbs ovoid, of a very pale whitish-green. 1850. A very distinct and handsome species, seldom exceeding 8in. in height. See Fig. 571. (B. O. 3, under name of *Odontoglossum Phalænopsis*.)

M. P. luxurians (luxuriant). *fl.*, lip having two large crimson blotches on the front lobe, some crimson streaks on the side lobes, and the callus broadly bordered with yellow. 1881. A free-growing, floriferous variety. (I. H. 417.)

M. P. solare (solar). *fl.*, anterior part of lip very broad, basilar portion broad, nearly circular, and of a yellow colour, with stripes, all with outward points of purple. 1879. A curious and interesting variety.

M. Regnelli (Regnell's).* *fl.*, sepals and petals soft rosy-white, bordered with white, broad, spreading; lip flat, lilac-rose; scape erect, as long as the leaves, many-flowered. Autumn. Pseudo-bulbs somewhat conical, bearing narrow pale green leaves upon their summit. *h.* 1ft. 1864. A very desirable erect-growing species. (B. M. 5436.) There is a handsome variety, *purpurea*, with lip of a rich rosy-purple hue.

M. Roezli (Roezl's). *fl.*, sepals pearly-white; petals stained with a rich vinous-purple at the base; lip large, flat, bilobed in front,

Miltonia—*continued.*

white stained with yellow at the base, and ornamented more or less with streaks of chocolate-brown; racemes three or four-flowered. Autumn. *l.* narrowly-lanceolate. Pseudo-bulbs 2½in. high. 1873. In general habit and appearance there is little difference between this species and *M. vexillaria*, but the sepals and petals are longer than in the latter. (B. M. 6085; B. O. 30, under name of *Odontoglossum Roezlii*.)

M. R. album (white). *fl.* large; lip broad, obcordate, pure white, with a small yellow crest. 1875.

M. Russellianum (Duke of Bedford's). *fl.*, sepals and petals dark purple, margined with green, ovate-oblong; lip lilac, with purple disk, margined with white; raceme few-flowered, radical. *l.* broad, ligulate-lanceolate, green, spreading. Pseudo-bulbs ovate, costate, two-leaved. 1835. (B. R. 1830, under name of *Oncidium Russellianum*.)

M. spectabilis (showy).* *fl.*, very showy, from 3in. to 4in. across; sepals and petals somewhat short, pure white, often tinged with rose at the base; lip very large, of a rosy-violet, margined with white; scape one-flowered. Autumn. Pseudo-bulbs produced upon a creeping stem, considerably compressed, and bearing a pair of thin, strap-shaped leaves upon their summit. *h.* 6in. to 8in. 1835. This species is by far the best known of the genus, and, when well grown, is a most beautiful plant. See Fig. 572. (B. M. 4204.) There are several varieties of more or less excellence.

M. s. bicolor (two-coloured). *fl.* white; lip white, with a blotch of violet in the upper part. August. 1839. A handsome variety, but with a stronger habit and larger flowers than the type.

M. s. Moreliana (Morel's).* *fl.*, sepals and petals deep purple; lip also of a rich deep purple, streaked and shaded with rose. In habit of growth this closely resembles the type; indeed, it can only be distinguished by the flowers, which are even larger than those of *M. spectabilis*. (B. M. 4425.)

M. s. rosea (rose-coloured). *fl.*, lip rose. SYN. *M. Warneri*.

M. s. virginalis (virgin). *fl.* pure white, with a spot of rose.

M. vexillaria (standard).* *fl.* variable in size, in three or four-flowered racemes; perianth quite flat; sepals sub-equal, obovate-oblong or obovate-cuneate, sub-acute or truncate, flat, rather recurved, very pale rose; petals larger or smaller than the sepals, deep rose, with a broad white margin; lip white, suffused with deep rose on the disk of each half, and pale yellow, streaked with red, on the claw; column very short. *l.* narrowly-elliptic-lanceolate, from a narrower sheathing base, acute, keeled, deep green above, paler beneath. Pseudo-bulbs narrow-oblong, compressed. 1872. See Fig. 573. (B. M. 6037, under name of *Odontoglossum vexillarium*.)

M. Warneri (Warner's). A synonym of *M. spectabilis rosea*.

M. Warscewiczii (Warscewicz's).* *fl.*, sepals and petals bright cinnamon, tipped with yellow, undulate at the margins; lip flat, of a soft violet-purple, white in front, tinged or blotched occasionally with brownish-yellow; scape, in vigorous specimens,

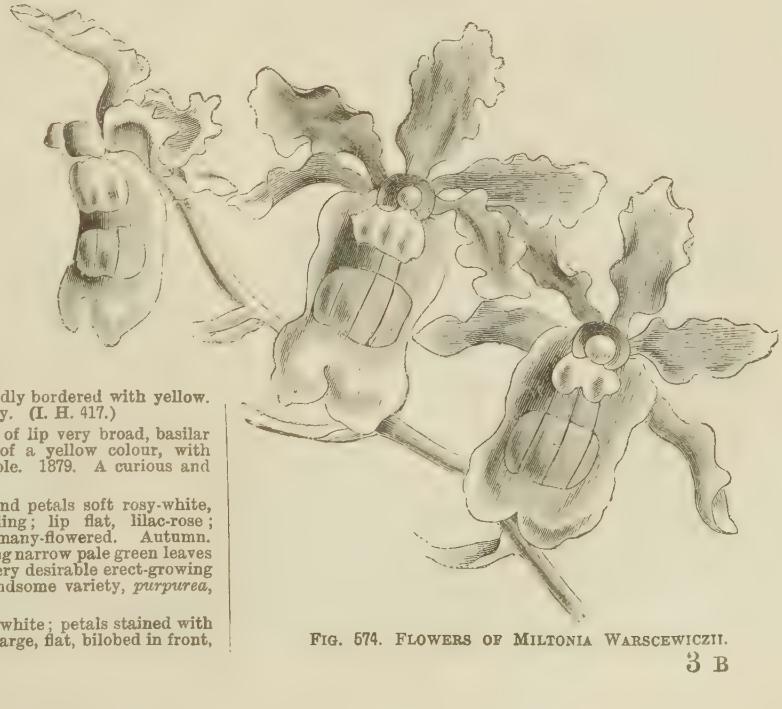


FIG. 574. FLOWERS OF MILTONIA WARSCEWICZII.

Miltonia—*continued.*

erect and branched (differing, in this respect, from most other members of the genus), many-flowered. Under favourable conditions, it will blossom twice during the year. Pseudo-bulbs long, much flattened or compressed, dark green, bearing two leaves. Peru, 1869. A beautiful, erect-growing species, requiring less heat than the Brazilian species, and subject, apparently, to considerable variation in the colour of its flowers in different specimens. It was first sold under the name of *Oncidium Weltoni*, and has also been known in gardens as *Oncidium fuscatum* and *Odontoglossum Weltoni*. See Fig. 574. (B. M. 5843.)

MIMETES (from *mimos*, a mimic; referring to its resemblance to an allied genus). Including *Orothamnus*. ORD. *Proteaceæ*. A genus comprising fourteen species of greenhouse, evergreen shrubs, natives of South Africa. Flower-heads hermaphrodite; perianth narrow, often incurved; limb ovoid or oblong. Nuts sessile, ovoid, glabrous. Leaves few, sessile, entire, or rarely dentate at apex. The undermentioned species, probably the only one yet introduced, thrives in a peat and loam soil, with plenty of moisture. Cuttings of the ripened shoots should be taken, towards autumn, or in the spring, before growth commences, and inserted in sand, under a glass, without bottom heat—at least, until a swelling occurs at their base.

M. Zeyheri (Zeyher's). *fl.-heads* one to three or more at the extremity of a branch, drooping; bracts glabrous, similar to the leaves; leaves of involucre petaloid, rose-red, veined, villous; laciniæ of the calyx villous. July. *l.* alternate on the branches, sessile, imbricated, numerous, entire, elliptic, membranous, externally convex, within concave, 1in. to 1½in. long, margined with purple. *h.* 6ft. to 8ft. (B. M. 4357, under name of *Orothamnus Zeyheri*.)

MIMOSA (from *mimos*, a mimic; the leaves of many of the species mimic animal sensibility). Sensitive Plant. ORD. *Leguminosæ*. This genus, as now understood, comprises about 230 species of herbs, rarely tall climbing shrubs, or unarmed or prickly trees, natives, for the most part, of the warmer parts of America, a few inhabiting tropical Africa and the East Indies, but none are yet known from Australia. Flowers small, sessile, in globose heads or cylindrical spikes; peduncles axillary, solitary, or fasciculate. Leaves bipinnate, often sensitive, with one or more pairs of pinnæ, each pinna bearing two or more pairs

FIG. 575. FLOWERING BRANCH AND SINGLE FLOWER-HEAD, WITH LEAF, OF MIMOSA PUDICA.

of leaflets. Mimosas thrive in a compost of loam and peat, in equal proportions, to which a small portion of sand may be added. Propagated by seeds, sown, during spring, in a hotbed; or by cuttings of rather firm young shoots, inserted in sandy soil, in heat. The species commonly known as the "Sensitive Plant" is *M. pudica*, whereas the true one is *M. sensitiva*. *M. pudica* is usually treated as an annual, but, under stove treatment, it assumes a perennial character.

M. marginata (margined).* *fl.* in purplish heads on peduncles at least twice as long as the leaves. Summer. *l.* pinnate; leaflets

Mimosa—*continued.*

with ciliated margins. Extra-tropical South America. A handsome prostrate shrub, producing long slender shoots, which have an elegant appearance, if allowed to hang down from the rafters of a conservatory.

M. pudica (chaste).* Humble Plant. *fl.* red. Summer. *l.* somewhat digitately pinnate, with four pinnæ, each pinna bearing many pairs of linear leaflets. Stem herbaceous, prickly, with the petioles and peduncles more or less beset with stiff hairs or bristles. *h.* 1ft. Tropical America (naturalised in many parts of tropical Africa and Asia), 1638. A well-known plant, even more sensitive than the true *M. sensitiva*. See Fig. 575. (A. B. R. 544.)

M. scandens (climbing). A synonym of *Entada scandens*.

M. sensitiva (sensitive). *fl.* purple. Summer. *l.*, leaflets ovate, acute, clothed with adpressed hairs beneath, but glabrous above, not so sensitive to the touch as those of *M. pudica*. Stem and petioles prickly. *h.* 3ft. to 6ft. Tropical America, 1648. An evergreen shrub. (B. R. 25.)

MIMULUS (from *mimo*, an ape; in reference to the ringent corolla). Monkey Flower. Including *Diplacus*. ORD. *Scrophularineæ*. A genus comprising about forty species of hardy or half-hardy, erect or decumbent, glabrous, pilose, or viscid, herbs, rarely tall or shrubby. They are dispersed over the extra-tropical or mountainous parts of America, Asia, Australia, and Africa, being numerous in Western America; but the genus is totally absent from Europe and the whole Mediterranean region. Flowers axillary, solitary, pedicellate, superior ones sometimes racemose; corolla bilabiate; upper lip erect or reflexed, bilobate; lower lip trilobate. Leaves opposite, undivided, entire, or toothed. The species are showy and ornamental, and their culture is very simple. All the herbaceous species thrive best in a rather moist situation, and are well worth naturalising in damp borders, by the margins of streams, and in similar situations. The shrubby species do best under pot culture in a cool greenhouse. The seed, being generally very small, must be sown on the surface, and only very lightly covered with soil. When the seedlings are 1in. or so high, they should be transferred singly to 6in. pots, and again into the next larger size just previous to flowering. An excellent compost for pot culture is two parts loam, one leaf soil, and one cow manure. The common Musk, *M. moschatus*, is a well-known and favourite plant, both for outside borders and for pot culture in spring. Its variety, *Harrisonii*, is a strong-growing, large-flowered form, which has become equally as popular as the type. It makes an excellent pot plant. Propagation of Mimulus may also be effected by cuttings and by divisions.

M. aurantiacus (orange). A synonym of *M. glutinosus*.

FIG. 576. UPPER PORTION OF PLANT AND DETACHED FLOWER OF MIMULUS CARDINALIS.

M. cardinalis (cardinal).* *fl.* red, large; peduncles longer than the leaves. June to August. *l.* stem-clasping, ovate, with erosely toothed margins. *h.* 1ft. to 3ft. Oregon to California and Mexico,

Mimulus—*continued.*

1835. An erect, villous, hardy perennial. See Fig. 576. (B. M. 3560; S. B. F. G. ser. ii. 358.)

M. Fremontii (Fremont's). *fl.* crimson, with spreading limb. *l.* spathulate or oblong. Stems 2in. to 4in. high. California, 1882. Half-hardy or greenhouse perennial, suitable for pot culture.

M. glutinosus (glutinous).* *fl.*, corolla usually buff or salmon-colour, obscurely bilabiate. Flowers nearly all the year round. *l.* linear-lanceolate, sub-connate, serrulate, acute. *h.* 5ft. California. A very elegant, erect, branching, greenhouse shrub. SYN. *Diplacus glutinosus.* (B. M. 354, under name of *M. aurantiacus.*)

M. g. puniceus (scarlet).* *fl.* varying from orange-red to scarlet; corolla lobes commonly obcordate. Western California. (B. M. 3655, under name of *Diplacus puniceus.*)

M. guttatus (speckled). A synonym of *M. luteus guttatus.*

M. Lewisii (Lewis').* *fl.* rose-coloured; corolla lobes spreading; peduncles longer than the leaves. August. *l.* amplexicaul, oblong, or rarely ovate, acute, somewhat toothed, many-nerved. *h.* 1ft. California, &c., 1831. Hardy, herbaceous, erect. SYN. *M. roseus* (under which name it is figured in B. M. 3353, B. R. 1591, L. B. C. 1976, and S. B. F. G. ser. ii. 210).

M. luteus (yellow).* Common Monkey Flower. *fl.* yellow, with two dark marks in the mouth of the corolla. Summer. *l.* ovate or oblong, coarsely toothed. Stems ascending, stout, hollow, glabrous or glandular. *h.* 9in. to 12in. Chili, 1826. Though generally treated as a half-hardy or hardy annual, this species is, under favourable conditions, of perennial duration. (A. B. R. 661; B. M. 1501.) Mr. Hemsley remarks, in his "Handbook of Hardy Trees, Shrubs, and Herbaceous Plants": "*M. variegatus*

FIG. 577. FLOWERING BRANCH OF MIMULUS LUTEUS VARIEGATUS.

(SYN. *M. rivularis*, see Fig. 577) and *M. guttatus* are considered by some botanists as varieties of *M. luteus*, and by others as distinct species; and the fact that hybrids between these forms and *M. luteus* are frequent, seems to strengthen the former supposition. *M. variegatus* (L. B. C. 1872) is a Chilian form,

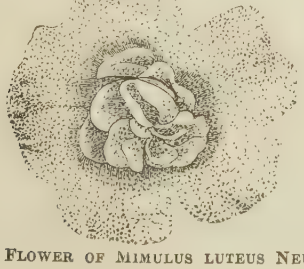


FIG. 578 FLOWER OF MIMULUS LUTEUS NEUBERTI.

Mimulus—*continued.*

having much larger, richly coloured flowers, irregularly blotched with crimson, maroon, or purple, on a yellow or white ground, sometimes uniformly yellow or reddish. *M. guttatus* is a Californian form near the last, in which the flowers are spotted with purple-brown on a yellow ground. The intermediate varieties of these three forms are numerous and beautiful." (B. M. 3336, 3363; B. R. 1030, 1796; S. B. F. G. ser. ii. 406.) *M. l. Neuberti* (Fig. 578) is a strain with double flowers. *M. l. nobilis* (Fig. 579)

FIG. 579. MIMULUS LUTEUS NOBILIS, showing Habit and detached Flower.

is a dwarf floriferous garden strain with "hose-in-hose" flowers varying in colour.

M. l. cupreus (coppery).* *fl.* copper-coloured, purplish-brown, or crimson, almost regular, with the limb of the corolla velvety and spotted. Summer. *l.* ovate-lanceolate, toothed; upper ones sessile. *h.* 8in. to 12in. Chili, 1861. (B. M. 5478; R. G. 422.) This species is the origin of a great number of very beautiful hybrids, known as *M. maculosus.*

M. moschatus (musk).* Musk. *fl.* yellow, small, nearly regular. June to September. *l.* petiolate, ovate, or ovate-lanceolate, a little toothed, rounded at the base, rather pilose, and somewhat clammy. Stems diffuse, clothed with woolly villi. North-western America, 1826. A well-known and favourite little hardy perennial. (B. R. 1118.)

M. primuloides (Primula-like).* *fl.* yellow, ringent, solitary, on axillary, scape-like, filiform peduncles, 3in. to 4in. long. *l.* obversely lanceolate or obovate, many-nerved. California, &c. Hardy tufted perennial. (R. G. 1009.)

M. radicans (rooting). *fl.* white, with a violet blotch; upper lip small, bifid, lower large and three-lobed. *l.* small, densely packed, obovate, obtuse, hairy or glabrous, ¼in. long. Stem creeping, with short leafy branches. New Zealand, 1883. A very pretty and attractive hardy perennial bog plant.

M. repens (creeping). *fl.* lilac, with a yellow-spotted throat, comparatively large. *l.* opposite, ovate or oblong. Australia, 1864. A dwarf greenhouse or half-hardy perennial. (B. M. 5423.)

M. rivularis (river-bank). A synonym of *M. luteus variegatus.*

M. roseus (rosy). A synonym of *M. Lewisii.*

M. variegatus (variegated). A synonym of *M. luteus variegatus.*

MIMUSOPS (from *mimo*, an ape, and *opsis*, a face; so named on account of the form of the corolla). SYN. *Synarrhena.* ORD. *Sapotaceæ.* A genus comprising about thirty species of milky-juiced stove trees, or rarely shrubs, broadly dispersed over the tropical regions of the globe. Flowers fasciculate, in the axils, at the nodes, or at the apices of the branches; calyx segments six or eight; corolla lobes eighteen to twenty-four. Berry globose, edible. Leaves coriaceous. The two species here described are probably the only ones yet introduced. For culture, *see* **Chrysophyllum.**

M. dissecta (divided). A synonym of *M. Kauki.*

M. Elengi (Elengi). *fl.* white, drooping, fragrant; petals lanceolate, a little torn at the tips; pedicels many together. *fr.* ovate, with a slight groove on one side, dotted, yellow when ripe. *l.* oval-lanceolate or oblong, acuminated. *h.* 50ft. Deccan and Malay Peninsulas, 1796. (B. F. S. 40.)

M. Kauki (Kauki). *fl.* white, fascicled. *fr.* oval, drooping. *l.* obovate, very blunt, silvery or hoary beneath, crowded at the ends of the branches. *h.* 30ft. Birma, Malaya, and tropical Australia, 1796. (B. M. 3157, under name of *M. dissecta.*)

MINA. Referred, by Bentham and Hooker, to *Ipomœa*.

MINT (*Mentha*). There are three species of Mint, all hardy perennials, cultivated more or less in gardens, for the use of their tops or leaves in the preparation of sauces, or for other culinary purposes. They are popularly known as Pennyroyal (*M. Pulegium*); Peppermint (*M. piperita*); and Spearmint (*M. viridis*).

Pennyroyal is least used of the three. It is readily propagated by division of the roots, in autumn or spring, and succeeds best in a moist, loamy soil. When transplanting, a space of 1ft. should be allowed between the rows, and half that distance between the plants.

Peppermint is grown chiefly for the use of its tops for distillation, to obtain the valuable cordial well known by the same name. Propagation may easily be effected by lifting the roots, in February or March, dividing them, and planting again in shallow trenches about 9in. apart, covering with 2in. of soil. Cuttings in summer, or offsets in spring, may also be utilised for increasing a stock. A moist situation is preferable, but Peppermint will succeed in almost any soil when once started into growth. The tops should be cut off just as they are coming into flower, and distilled as soon as possible afterwards. The beds are much benefited by an annual topdressing of good soil.

Spearmint is most largely in request, particularly in spring and early summer. A good stock should be kept up, so that plenty may be available for forcing. The propagation and cultivation are the same as given above for Peppermint. A portion of the tops should be cut when coming into flower, and suspended in a cool shed for winter use. Green leaves are always preferable to dry ones, and forcing is very easy, the only preparation being the insertion of a quantity of roots in a box of soil, which should be placed in a temperature of about 60deg., and kept watered. Forcing will generally be necessary from November to May, a succession being kept up by the introduction, at intervals, of an additional supply of roots.

FIG. 580. FLOWERING BRANCH OF MIRABILIS JALAPA.

MIRABILIS (from *mirabilis*, wonderful). Marvel of Peru. SYNS. *Jalapa, Nyctago.* ORD. *Nyctagineæ.*

Mirabilis—*continued.*

A genus comprising about ten species of very ornamental greenhouse or hardy di-trichotomously branched, glabrous or glandular-pubescent, perennial herbs, confined to the warmer parts of America. Flowers white, scarlet, or various-coloured, large, fragrant or inodorous; involucres one to many-flowered, in often densely-branched cymes; perianth tube elongated, constricted above the ovary. Leaves opposite, lower ones petiolate, upper ones sessile. Root elongated or tuberous. The species most generally grown is *M. Jalapa*. This thrives very well in almost any ordinary garden soil, but does best in a good friable loam. It is really perennial, but is usually treated as a half-hardy annual, by sowing seeds, in a warm frame, during the early spring, and planting the seedlings out in the open in May. The other species mentioned prove hardy in the South of England, and require similar treatment.

M. dichotoma (twice-forked). *fl.* yellow, expanding in the afternoon. July. *l.* ovate, sub-acuminate, obtuse at base. *h.* 2ft. Mexico, 1640. Greenhouse.

M. Jalapa (jalap).* Common Marvel of Peru. *fl.* very variable, white, yellow, crimson, or striped or blotched with two or more of these colours, fragrant. Summer. *l.* large, entire, smooth. *h.* 2ft. Mexico and Central America, 1596. Generally treated as a half-hardy annual, but the tuberous roots can be taken up and stored like Dahlias. See Fig. 580. (B. M. 371.)

M. longiflora (long-flowered). *fl.* varying in colour from white and pink to violet, long, tubular, fragrant, viscid. July. *l.* cordate, acuminate. *h.* 2ft. Mexico, 1759. Hardy. (S. E. B. 23.)

M. multiflora (many-flowered).* *fl.* bright purple, with a tube about 2in. long, disposed in terminal panicles, each panicle inclosed in a cup-like involucre. *l.* opposite, ovate. Mexico and California, 1876. A very beautiful hardy plant, clothed with glandular pubescence. (B. M. 6266.)

MIRBELIA (named after C. F. Mirbel, 1776-1854, a distinguished French physiological botanist). Including *Dichosema* and *Oxycladium*. ORD. *Leguminosæ.* This genus comprises about sixteen species of greenhouse shrubs, with the habit of *Oxylobium* or of *Chorizema*, limited to Australia. Flowers yellow, purple-red, or blue, solitary, or clustered in the axils of the leaves, or in axillary or terminal racemes. Leaves opposite or whorled, rarely alternate, entire or broadly lobed at the top. The species here described are those best known to cultivation. For culture, *see* **Chorizema.**

M. dilata (dilated). *fl.* purplish. May to August. *l.* cuneiform, dilated and trifid at the apex. *h.* 3ft. 1803. (B. R. 1041.)

M. grandiflora (large-flowered). *fl.* yellow, having a red zonate mark on the upper side of the vexillum, and streaked with the same on the outer surface, the wings having a red blotch on one side; axillary, twin. May. *l.* alternate, ovate-lanceolate. *h.* 1ft. to 2ft. 1823. (B. M. 2771.)

M. reticulata (netted). *fl.* lilac, terminal, capitate, or axillary, verticillate. May to August. *l.* lanceolate-linear, reticulately veined, quite entire, ending in a stiff mucrone. *h.* 1ft. to 3ft. 1792. (B. M. 1211.)

M. speciosa (showy). *fl.* purple, disposed in a terminal, interrupted, leafy spike. May to July. *l.* linear, rather acute, with revolute, quite entire margins. *h.* 1ft. to 2ft. 1824. (B. R. 1841, 58.)

MISCANTHUS (from *miskos*, a stem, and *anthos*, a flower; alluding to the tall stems). ORD. *Gramineæ.* A genus comprising eight species of tall grasses, of which one is South African, and the rest inhabitants of Eastern Asia, from the Malayan Archipelago to Japan. Panicles terminal, large, with long silky hairs, or rarely almost glabrous; branches spreading, simple or scarcely divided. Leaves narrow, often flat. Probably none of the species have yet been introduced to our gardens.

MISTLETOE. *See* **Viscum album.**

MITCHELLA (named after Dr. John Mitchell, of Virginia, an early correspondent of Linnæus, and an excellent botanist; he died in 1768). ORD. *Rubiaceæ.* A genus comprising a couple of species of glabrous or puberulous creeping herbs, one dispersed through North America, from Mexico to Canada, and the other inhabiting Japan. Flowers white, fragrant, axillary and terminal, ebracteate, small; calyx tube ovoid; limb three

Mitchella—*continued.*

to six-toothed, persistent; corolla funnel-shaped; throat bearded; limb three to six-lobed, bearded within, recurved, valvate. Fruit scarlet. Leaves opposite, shortly petiolate, ovate-rotundate; stipules intrapetiolar, minute. *M. repens*, the species introduced to cultivation, is a pretty little plant for rockeries, hardy ferneries, and such like places. Propagated by division of the roots.

M. repens (creeping).* *fl.* white, tinged with purple, usually two together on the top of each peduncle, fragrant. Summer. *l.* small, opposite, roundish-ovate, smooth, shining, often variegated with whitish lines. North America, 1761. (L. B. C. 979.)

MITELLA (a diminutive from *mitra*, a mitre or cap; alluding to the form of the young pod). Including *Drummondia.* ORD. *Saxifrageæ.* A genus consisting of five species of hardy perennial herbs, natives of North America and North-eastern Asia, only two of which have been introduced. Flowers greenish, small, distant, often secund or nodding, in slender many-flowered racemes; scape slender, erect, naked, or one or two-leaved. Leaves long-stalked, cordate, lobed or crenated. The species thrive in any light soil, but do best if grown in peat. Propagated by divisions. *M. diphylla* is a pretty plant for the rockery. Both the species here described are from North America.

M. diphylla (two-leaved). *fl.* white, with pinnatifidly fringed petals. April. *l.*, radical ones cordate, somewhat three to five-lobed, dentately serrated, on long petioles; cauline ones two, opposite, smaller, and nearly sessile. *h.* 6in. to 9in. 1731. (B. R. 166.)

M. pentandra (five-anthered).* *fl.* yellowish; petals five, pectinately pinnatifid, alternating with the sepals; scape leafless. May. *l.*, radical ones on long petioles, cordate, bluntly lobed. *h.* 6in. 1827. SYN. *Drummondia mitelloides.* (B. M. 2933.)

MITES. These form a group of animals related to the true Spiders, but differing from them in their very small size, and in having the abdomen closely united with the front part of the body, instead of being joined to it by a narrow stalk. Most Mites have six jointed legs when young, and eight when full-grown; though in a good many the posterior pairs are very small and useless, or may not be present. One group, the *Phytopti*, or Gall Mites, so far as known, have never more than two pairs of very short legs, on the lower surface of the body, in front. All the true Mites are so small as to render the microscope indispensable in examining them; but, despite their small size, they form an important order of animals, because of their abundance and habits. Many species live on dead or decaying organic matter; others exist as parasites on living animals, especially on insects; and those belonging to *Tetranychidæ* and *Phytoptidæ* are parasites on living plants, and therefore deserve somewhat fuller mention here. The species parasitic on animals may be regarded as mostly useful, since they feed largely on insects; but among them are one or two that are, at certain seasons, very troublesome to gardeners, fruit-pickers, and others. The best known of these is the Harvest Bug (*Tetranychus*, or *Leptus autumnalis*), which is of a brick-red colour, and so minute as to be invisible to the naked eye, and which swarms upon bushes and vegetables in the garden, as well as in hay and stubble fields. They feed ordinarily on plant juices, but very readily attack the human skin, especially the skin of women and children; and they are also very troublesome to domestic animals. Wherever a Mite has fixed on the skin, it causes a hard swelling of a red colour, and the place bitten continues to itch greatly for some time. Mites are more abundant during late summer and autumn. They attack some people very severely, others hardly at all. Remedies are as follows: Washing the parts bitten with weak spirits will often prove serviceable in reducing the itching. Sulphur ointment, solution of carbolic acid, and benzine, have also been used, and have been found to give relief. The true Itch Mite (*Sarcoptes scabiei*) is sometimes very annoying, as it causes intense itching at the wrists and knuckles, where it burrows under the skin. The disease is propagated by contact of healthy with diseased hands, directly, or by handling the same things. It is easily got rid of by personal cleanliness and the use of sulphur ointment.

Mites—*continued.*

The Plant Mites belong to the two families *Tetranychidæ* and *Phytoptidæ*. The former group includes eight-legged Mites, which live on leaves and twigs, suck the juices, and often greatly injure the plants thereby. They are usually minute, semi-transparent, and some shade of white, yellow, or pale brick-red. They spin a web on the backs of the leaves. The latter become discoloured, and turn yellowish or grey above, shining dirty-white below. Garden and greenhouse plants often suffer much from their attacks. They are best combated by applications of soft soap and sulphur. Quassia solutions may also be used. *See also* **Red Spider.**

The *Phytoptidæ*, or Gall Mites, have long, slender, nearly colourless bodies, and are easily known by their form, their having two pairs of very short legs near the head, and their habit of forming galls on plants. The Mites are very numerous, but are too small and too similar to be easily distinguished; hence, the galls must be employed to recognise the kind of Mites that made them. Cultivated trees and herbs seldom suffer much from the galls on them, so that it is needless here to mention more than the chief forms. These are: 1. The *Erineum* galls, in the form of patches of velvety hairs on the lower (rarely upper) surface of the leaves; these patches pass from white into rusty-brown. They were at one time described as fungi. Examples occur on Apple, Maple, Birch, Beech, &c. 2. Inrolled leaf-margins, with thickened and discoloured tissues, such as may often be seen on leaves of Hawthorn. 3. Blistered spots in the leaves; these spots become brown or black, and are then very conspicuous. Pear leaves are, at times, very much injured in this way; and Elm leaves are yet more frequently infested, though the injury done to them is less. On a careful examination, there is found to be a small hole on the lower surface, about the middle of each discoloured spot, giving passage to the Mites to and from the interior of the leaf. 4. Wart, or Nail Galls, consist of outgrowths from the upper surface of leaves, like warts, about the size of pin-heads, or like small nails, reaching ¼in. long, and are abundant on Lime, Maple, Willow, and many other trees and shrubs; but, beyond their unsightliness, they usually do little harm to the plants. 5. Bud Galls are buds caused to swell greatly, but to remain unopened, or to form only sickly branches; or, if this continues for some years, it may give rise to knots of diseased branches. The Mites live between the scales of the buds. Much harm is done in this way to Black Currant bushes in some places, and also to Hazel and to Birch. 6. The flower-buds are injured, and become green, and the parts of the flowers are often replaced by green structures, as in reversions to the leaf-type. Campanulas, and a few other cultivated subjects, are liable to this change; but it is more frequent in some wild plants; *e.g.*, in the genus *Galium*, or the Bedstraws. Yet other forms of Mite Galls might be noted, but they are of no practical moment to gardeners.

It is impossible to reach the Mites, protected as they are in their galls. As a rule, the species that gall the leaves do little practical mischief; but those that gall the buds so spoil the appearance of some plants as to render their destruction desirable. The only certain method is to collect the plants that bear the young galls, and destroy them before the exit of the Mites. Plants (*e.g.*, Currants) badly affected with Bud Galls should be uprooted and burned, and the ground allowed to remain clear of the same plants for a year or two at least.

MITRACARPUM (from *mitra*, a mitre, and *karpos*, a fruit; in allusion to the fruit being cut round about in the middle). ORD. *Rubiaceæ*. A genus comprising about thirty species of erect or prostrate herbs, very often with a perennial root, for the most part inhabiting tropical America, with a few from tropical and Southern Africa. Flowers white, minute, in dense-flowered heads; calyx tube turbinate, obovoid, or subglobose; limb four or five-toothed; corolla salver-shaped or funnel-formed; tube often with a band of hairs within, throat naked or villous. Leaves opposite, linear-lanceolate or ovate. *M. stylosum*, the species introduced to cultivation, is a stove annual. None of the species are of any horticultural merit.

MITRARIA (from *mitra*, a mitre; in reference to the shape of the seed-pod). SYN. *Diplocalyx*. ORD. *Gesneraceæ*. A monotypic genus. The species is a very ornamental, hardy or half-hardy, diffuse or climbing, pubescent or glabrous, evergreen shrub, of comparatively easy culture, and thriving best in moderately close, rather fibry peat, with plenty of sand. Perfect drainage is very essential. If grown in pots, it requires a cool shady situation; an arid atmosphere is fatal to success. Propagated freely by divisions of the root in spring; or by cuttings, taken any time during spring or summer, and inserted in a light soil, under a bell glass.

Mitraria—*continued.*

M. coccinea (scarlet).* *fl.* bright scarlet, about 1½in. long, solitary in the axils, on pendent slender pedicels; calyx free; corolla tube elongated, inflated. May to July. *l.* ovate, acute, small, serrated, sub-coriaceous. Stems scandent. Chiloe, 1848. (B. M. 4462; F. d. S. 385.)

FIG. 581. FLOWERING BRANCH AND DETACHED SINGLE FLOWER OF MITRIOSTIGMA AXILLARE.

MITRIFORM. Formed liked a mitre.

MITRIOSTIGMA (from *mitra*, a mitre, and *stigma*; in reference to the shape of the pistil). ORD. *Rubiaceæ*. A small genus (two species) of glabrous, unarmed, stove shrubs, related to *Gardenia*, with which they are usually classed. One comes from the Cape of Good Hope, and the other is a native of Fernando Po. Flowers disposed in short,

Mitriostigma—*continued.*

few-flowered, branched cymes; calyx tube ovoid; limb five-parted; corolla narrowly campanulate, with a short tube, a glabrous or villous throat, and a five-lobed rotundate limb. Leaves opposite, petiolate, membranaceous, elliptic-lanceolate, acuminate. For culture of *M. axillare*, *see* **Gardenia.**

M. axillare (axillary-flowered).* *fl.* white, very fragrant, single, axillary. Spring. *l.* opposite, somewhat coriaceous, elliptical, lanceolate, dark green. *h.* 5ft. Natal. A compact spreading species. See Fig. 581. (B. M. 4987, under name of *Gardenia citriodora*.)

MNEMOSILLA. A synonym of **Hypecoum** (which *see*).

MOCKER NUT. *See* **Carya tomentosa.**

MODECCA (the East Indian name of one of the species). ORD. *Passifloreæ*. A genus comprising about twenty-five species of stove evergreen climbing shrubs, with the general habit of *Bryonia*; they are found in Asia, Africa, and tropical Australia. Flowers unisexual; peduncles axillary, branched. Leaves entire, palmately lobed, or pinnatifid. The species have no horticultural value.

MODIOLA (from *modiolus*, the nave of a wheel; referring to the formation of the seed vessel). ORD. *Malvaceæ*. A genus containing several species (which are, in all probability, only varieties of one) of hardy, or nearly hardy, creeping or trailing herbs. Flowers on axillary, solitary, rarely twin, one-flowered, slender peduncles. Leaves usually five-lobed, doubly serrate. *M. multifida*, a North American plant, of no horticultural merit, is in cultivation in botanic gardens.

M. geranioides (Geranium-like). A synonym of *Malvastrum Gilliesii*.

MŒHNIA. A synonym of **Gazania** (which *see*).

MŒHRINGIA (named after Paul Henry Gerard Mœhring, a German physician, author of "Hortus Proprius," 1736). ORD. *Caryophylleæ*. A small genus (included, by Bentham and Hooker, under *Arenaria*) of pretty, hardy, herbaceous perennials, allied to *Arenaria*, but differing in the seeds, which have a strophiole at the hilum. Flowers pentamerous or tetramerous. For culture, *see* **Arenaria.**

M. muscosa (mossy).* *fl.* white, small, axillary, solitary. Summer. *l.* linear, connate. *h.* 3in. to 4in. Europe, 1775.

MOHRIA (named after Daniel Mohr, a German botanist, who died in 1808). ORD. *Filices*. A monotypic genus. The species is a sweet-scented greenhouse fern, with the habit of *Cheilanthes*. Capsules sessile, placed on the back of the leafy frond near the edge. *M. caffrorum* and its variety require a compost of peat and sand, to which should be added small lumps of sandstone. They thrive in a cool greenhouse, and constitute pretty subjects for the Wardian case, if plenty of room is allowed. For general culture, *see* **Ferns.**

M. caffrorum (Kaffir).* *sti.* tufted, 3in. to 4in. long, slightly scaly. *fronds* 6in. to 18in. long, 2in. to 4in. broad, tripinnatifid; pinnæ close, lanceolate-oblong, cut down to a narrowly-winged rachis into oblong pinnules, which are pinnatifid and deeply toothed in the barren frond, less divided in the fertile one. Cape of Good Hope, &c., 1842. SYN. *M. thurifragra*.

M. c. achilleæfolia (Achillea-leaved). A finely-cut variety, with the fronds almost quadripinnatifid. It is not so robust as the type, and is much rarer in cultivation.

M. thurifragra (frankincense). A synonym of *M. caffrorum*.

MOLE (*Talpa Europœa*). This animal is too universally known to call for any detailed description of its appearance. Its structure is remarkable, because of the numerous adaptations that it presents to fit the animal for burrowing, and for rapid movement through the tunnels it has made a few inches below the surface of the soil. The front part of the body is much stouter than the rear. The fore legs are very powerful, and have the bones curiously modified to support the very strong muscles of the limb, which serves the part of a digging instrument, and to throw the loosened earth backwards. The hand, or fore paw, is made broader by an additional bone along the inner side. The skin is strong, and the fur is close and velvety, and lies smoothly in whatever direction it is stroked. The eyes are so small as to be practically useless to the animals, which are, however, possessed of acute hearing and smell. The teeth prove them to be carnivorous, and observation proves that Moles feed on insects, chiefly as larvæ, and on earthworms. Occasionally a little vegetable matter may be swallowed along with this food. The home of the Mole is usually situated in some well-protected place, *e.g.*, under a large stone or the root of a tree; and there are usually several passages diverging from it, into any one of which the Mole may retreat for shelter when in danger. The female makes a nest of dried grass, or other herbage, in a specially-constructed chamber, and in it she brings forth four or five naked young ones. It is probable that Moles do more good than harm when they confine their operations to the fields; but in gardens they do much damage in flower borders, by cutting the roots of the flowers; and their earth-heaps render lawns very unsightly. It is, therefore, necessary to remove them from gardens whenever they find their way in, and this is best done by the use of traps set in their burrows or runs. As the animals are very wary, it is needful to take special precautions against the smell of one's hands remaining about the traps. Where a molecatcher's services can be obtained, it will probably be found advisable to employ them if it is necessary to rid a garden of Moles.

Mole—*continued.*

MOLE CRICKET (*Gryllotalpa vulgaris*). This insect belongs to the family *Gryllidæ*, of the order *Orthoptera*, but is so different in its whole appearance from any other of our native insects, that there can be no difficulty in recognising it from the accompanying wood-

FIG. 582. MOLE CRICKET.

cut (Fig. 582). Its colour is smoky-brown above, and yellowish-red below, with a velvety gloss on the surface. The sexes are much alike, but the females have the abdomen large, the sixth ring being broader than the others, while in the male the sixth ring is the narrowest. They reach a length of between 1½in. and 2in. The popular name of "Mole Cricket" is derived from the resemblance in form of the front pair of legs to those of a mole, the legs in each being broad, flattened, very strong, and so placed as to form very efficient instruments for digging burrows, and for throwing the earth backwards. The form of the body also in both is suited to permit easy movement along the burrows. The insect prefers light, sandy, or cultivated soils, and is, therefore, partial to gardens, and avoids stiff clays. It occurs throughout Southern and Central Europe, and is common in many places in the South of Britain, but does not extend to the North. It remains so hidden in its burrows that its presence in a locality may hardly be suspected, even where common when looked for. In digging its burrows, it cuts the roots that it encounters, causing the plants to wither without evident cause. The female makes a nest underground, and in it lays from 200 to 400 eggs; when the larvæ emerge, she watches over them till their first

Mole Cricket—*continued.*

change of skin, after which they dig burrows for themselves. The development from the egg to the perfect state is said to require from two to three years. The metamorphosis is incomplete. Mole Crickets eat the underground parts (whether roots or stems) of many plants, *e.g.*, Potatoes, roots of potherbs, and flowers. But their favourite food seems to be insects and worms; and this may be regarded as, to some extent, compensating for the damage done by them. They are so voracious that, when starved, they have been known to eat their own limbs. They may be caught by laying down pieces of raw meat as traps, on which the insects may be found feeding; or benzole or petroleum may be poured into their burrows to kill them, or to drive them away. Digging them out is often impracticable when they get into a flower-bed or border.

MOLINIA (named in honour of J. Molina, a writer upon Chilian plants). SYN. *Enodium.* ORD. *Gramineæ.* A monotypic genus. The species is a rather tall, tufted, hardy, perennial grass. It will thrive on wet, bleak moors, where the better sorts of grasses do not succeed.

M. cærulea (bluish). *fl.*, spikelets reddish, violet-purple, or green, few, narrow; flowering glumes deciduous, ovate-lanceolate, subacute; empty glumes shorter; anthers violet-brown; panicle 1in. to 12in. long, stout, much contracted; rachis flexuous, compressed; branches erect. July and August. *l.* smooth, rigid, hairy at base, the tips very slender; sheaths smooth. Stems 1ft. to 3ft. high, terete, striate, with but one node, and that towards the base, naked above. Europe (Britain). (Sy. En. B. 1747.) The variegated form, *M. c. variegata*, is an excellent bedding plant.

MOLLOYA. Included under **Grevillea** (which *see*).

MOLLUGINEÆ. A tribe of *Ficoideæ.*

MOLOPOSPERMUM (from *molops*, a stripe, and *sperma*, a seed; the fruit is yellowish, and the vittæ chestnut-coloured, giving the fruit the appearance of being striped). ORD. *Umbelliferæ.* A monotypic genus. The species is a large and handsome hardy fern-like perennial. It is an admirable subject for naturalising in the wild garden, and has been used with success when isolated on grass. It thrives best in a moderately good and deep soil. Propagated by divisions; or by seeds, sown when ripe.

M. cicutarium (Cicuta-like). *fl.* yellowish-white, umbellate; terminal umbels large, fertile; lateral ones smaller, male. May. *l.* ternately-decompound; leaflets lanceolate, elongated, shining or decurrently-pinnate; segments sharply pinnatifid. Stems large, hollow. *h.* 3ft. to 5ft. Mountains of Southern and Central Europe, 1596.

MOLTKIA (named after Count Gadske Moltke, who died in 1818; founder of a Museum of Natural History at Copenhagen). ORD. *Boragineæ.* A genus comprising six or seven species of elegant, hardy or half-hardy, strigose-canescent, herbaceous perennials, natives of South Europe and Eastern and Western Asia. Flowers blue or yellow, in terminal, secund bracteate spikes; corolla tubular, funnel-shaped, with a naked throat. Leaves alternate, narrow. The two species here described are probably the only ones yet introduced. For culture, *see* **Onosma.**

M. cærulea (blue). *fl.* bluish-purple; spikes 4in. to 6in. long; bracts lanceolate. April. *l.* oblong-lanceolate, acute, rather silky. Stem shrubby at the base, ascending. *h.* 1ft. Asia Minor, &c., 1829.

M. petræa (rock).* *fl.* at first pinkish-purple, deep violet-blue when open, in simple, forked or branched, short, revolute, terminal, dense cymes; corolla glabrous; calyx hoary. June. *l.* 1in. to 1½in. long, one to two lines broad, narrow-linear or linear-oblong. Stem woody below. *h.* 6in. to 8in. Dalmatia, &c., 1845. This species thrives best in a cool greenhouse. (B. M. 5942, under name of *Lithospermum petræum*; B. R. 1843, 26, as *Echium petræum.*)

MOLUCCA. A synonym of **Moluccella** (which *see*).

MOLUCCELLA (a diminutive from Molucca, of which one of the species was supposed to be a native). SYN. *Molucca.* ORD. *Labiatæ.* This genus comprises a couple of species of hardy or half-hardy annuals, inhabiting the Mediterranean region. Whorls axillary, many-flowered.

Moluccella—*continued.*

Leaves petiolate, deeply crenated or cut. The species here described is remarkable on account of the singular form of the calyces, which are shallowly bell-shaped, and densely arranged on erect stems. It forms an excellent subject for skeletonising. Seeds should be sown in a hotbed, during spring, and the seedlings transferred to the open border during May. A sandy loam is the most suitable soil.

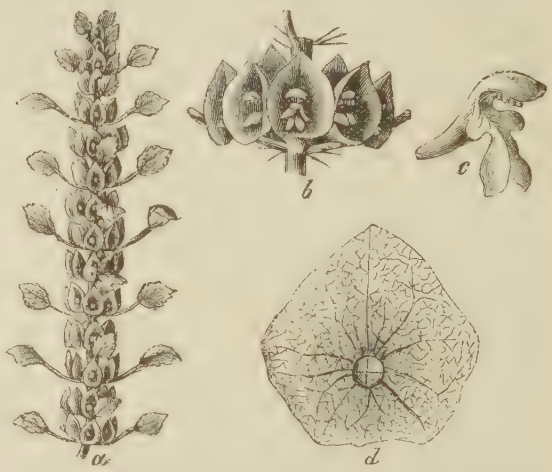


FIG. 583. MOLUCCELLA LÆVIS, showing (*a*) Upper Portion of Plant, (*b*) a single Whorl of Flowers, (*c*) Corolla, and (*d*) the large Calyx.

M. lævis (smooth). *fl.*, corolla white, shorter than the limb of the calyx, which is large, membranaceous, sub-pentagonal, and with five very short teeth; whorls usually six-flowered, distant. August. *l.* on long petioles, roundish, coarsely crenated. *h.* 1ft. to 1½ft. Syria, 1570. Hardy. See Fig. 583. (B. M. 1852).

MOLY. *See* **Allium Moly.**

MOMORDICA (from *momordi*, perfect of *mordeo*, to bite; the seeds have the appearance of being bitten). Including *Neurosperma.* ORD. *Cucurbitaceæ.* A genus comprising about twenty-six species of annual or perennial, glabrous or pilose, climbing stove herbs; they are mostly natives of Africa, but a few are thinly spread over the tropical regions of the globe. Flowers white, yellow, or straw-colour, small or large, of separate sexes, both of which are borne on the same or on different plants, and have a campanulate five-lobed calyx, and five distinct petals. Fruit oblong, fusiform, or cylindrical, baccate, indehiscent or three-valved, fleshy, prickly or warted externally, bursting when ripe, generally with elastic force, into irregular valves. Leaves entire, lobed or pedate, or three to seven-foliolate. The species in cultivation are raised annually from seed, which should be sown in heat early in spring. The plants may be grown in large pots of rich soil, or be planted out in a heated structure and trained up the rafter, or on a trellis. The fruits are very ornamental after they get ripe and burst open. The species here described are probably the only ones yet introduced.

M. Balsamina (balsam-bearing). Balsam Apple. *fl.* yellow, with brown spots. June. *fr.* orange-coloured, roundish-ovate, attenuated at both ends, angular, tuberculated, splitting irregularly and laterally. *l.* palmately five-lobed, toothed, glabrous, shining. Australia, Tropical Asia, and Africa, 1568. An exceedingly pretty annual, well adapted for trellises, arbours, &c., in warm situations outside, and in a rich light soil. Plenty of water should be given during the growing period.

M. Charantia (Charantia).* *fl.* yellow. June. *fr.* oblong, acuminated, angular, tuberculated, copper-coloured or red, bursting open, when ripe, at the apex. *l.* somewhat palmately five-lobed, dentate, rather hairy. India, Malaya, China, and tropical Africa, 1710. Allied to *M. Balsamina*, but very distinct, and larger in all its parts. (B. M. 2455.)

M. cochinchinensis (Cochin China). *fl.*, males very large, fully 4in. in diameter; calyx deeply cut into five ovate-lanceolate lobes, striated with black; corolla patenti-campanulate, of five petals,

Momordica—*continued.*

which are pale straw-coloured externally, villous within on the disk, and copiously veined; three inner petals black-purple at base; peduncles long, single-flowered; female flowers like the males, on peduncles 1in. to 2in. long, bracts small about the middle. July. *fr.* red, large, oval-rotundate. *l.* varying in size, cordate, palmately three to five-lobed; segments sinuate-dentate; petioles long, grooved, bearing conspicuous peziza-shaped glands. Stems climbing. India, Formosa, Philippines, &c., 1820. (B. M. 5145, under name of *M. mixta.*)

M. Elaterium (Elaterium). A synonym of *Ecballium Elaterium.*

M. mixta (mixed). A synonym of *M. cochinchinensis.*

MONACHANTHUS. Included under *Catasetum.*

MONACHOSORUM. Included under *Polypodium.*

MONADELPHOUS. Having the filaments cohering into a tube.

MONANDROUS. Having only one stamen.

MONANTHES (from *monos*, one, and *anthos*, a flower; the flowers are often solitary). SYN. *Petrophyes.* ORD. *Crassulaceæ.* A small genus (three species) of exceedingly dwarf and pretty, greenhouse, perennial, tufted herbs, natives of the Canary Islands and Morocco. Flowers purple or orange, small, on slender pedicels; petals six to twelve, linear or lanceolate; peduncles slender, erect, one to many-flowered, cymose or racemose. Leaves fleshy, rosulate, at the tips of the branchlets, or on elongated branches, opposite or alternate, clavate or cylindrical-ovoid. Stems filiform, dichotomous, creeping. For culture, *see* **Crassula.**

M. atlantica (Atlantic). *fl.* sub-solitary, and in short, few-flowered, terminal cymes; petals six, golden-yellow, speckled with red on the back, ovate-elliptic; anthers dark red. April. *l.* sub-sessile, ¼in. long, succulent. Stem branched from the base; branches prostrate, 1in. to 3in. long, naked below, bearing a densely imbricated rosette of twenty to thirty leaves towards the apex. Mount Atlas, 1871. (B. M. 5988, under name of *M. muralis.*)

M. muralis (wall), of Hooker. A synonym of *M. atlantica.*

MONARDA (named after Nicolas Monarda, or Monardes, 1493-1588, a physician and botanist of Seville). Horse Mint. ORD. *Labiatæ.* A genus comprising six or seven species of very ornamental hardy herbaceous perennials, inhabiting North America. Flowers in close heads or whorls, surrounded by bracts; corolla long and slender, deeply bilabiate. Leaves simple, toothed. The species are of very easy culture in ordinary soil, and in any position but a too shady one. Monardas may be readily increased in autumn by division of the roots. They have a more telling effect when planted in masses, than as small specimens, in mixed borders.

M. affinis (related). A synonym of *M. fistulosa.*

M. allophylla (different-leaved). A synonym of *M. fistulosa.*

M. altissima (very lofty). A synonym of *M. fistulosa.*

M. amplexicaulis (stem-clasping). A synonym of *M. Bradburiana.*

M. aristata (awned). A synonym of *M. clinopodioides.*

M. Bradburiana (Bradbury's). *fl.* white, pink, with reddish bracts; calyx hirsute, and somewhat contracted at the orifice, its teeth elongated and aristiform; corolla tube not exceeding the long and narrow, pubescent upper lip. June. *l.* ovate or ovate-lanceolate, from a broad roundish or sub-cordate base, acuminate. *h.* 2ft. 1850. SYN. *M. amplexicaulis.* (B. M. 3310, under name of *M. fistulosa flore-maculata.*)

M. clinopodioides (Clinopodium-like). *fl.*, bracts of the rather small heads mostly green or greenish, erect, oblong-ovate to obovate-lanceolate, rigid, strongly three to five-nerved, hispid-ciliate; calyx-teeth erect, rigid, aristiform-attenuate; tube purplish, hirsute; throat densely villous. Stem slender, 1ft. or more high. SYN. *M. aristata* (under which name it is figured in B. M. 3526).

M. didyma (twin).* Oswego Tea. *fl.* bright scarlet; whorls solitary or twin, supported by a leafy bract, the leaflets being of a pale green colour, tinted with red. July to September. *l.* petiolate, ovate-lanceolate, acuminated, roundly sub-cordate at the base, rather hispid on both surfaces. Stem square, grooved, hard. *h.* 1½ft. 1656. SYNS. *M. fistulosa, M. Kalmiana.* (B. M. 145.) See Fig. 584. (B. M. 546.)

M. fistulosa (fistular).* Wild Bergamot. *fl.* purple, less numerous than in *M. didyma*, and mostly produced in single heads; bracts tinted with purple. Summer. *l.* petiolate, ovate-lanceolate, roundly sub-cordate at the base. Stems fistular or filled. *h.* 2ft. to 5ft. 1656. This species has several varieties. SYNS. *M. affinis, M. allophylla, M. altissima, M. longifolia, M. oblongata.*

M. fistulosa (fistular), of Sims. A synonym of *M. didyma.*

M. f. flore-maculata (spotted-flowered). A synonym of *M. Bradburiana.*

M. f. media (intermediate). *fl.*, corolla deep purple. SYNS. *M. media* (S. B. F. G. 98), *M. purpurea* (L. B. C. 1396).

M. f. mollis (soft). *fl.*, corolla varying from flesh colour to lilac, glandular, and its upper lip hairy outside, or more bearded at the tip. *l.* paler, soft, pubescent beneath, often shorter petioled. SYNS. *M. Lindheimeri, M. menthæfolia* (B. M. 2958), *M. mollis, M. scabra.*

M. f. rubra (red). *fl.*, corolla bright crimson or rose-red. SYN. *M. purpurea.*

FIG. 584. FLOWERING BRANCH OF MONARDA DIDYMA.

M. Kalmiana (Kalm's). A synonym of *M. didyma.*

M. Lindheimeri (Lindheimer's). A synonym of *M. fistulosa mollis.*

M. longifolia (long-leaved). A synonym of *M. fistulosa.*

M. lutea (yellow). A synonym of *M. punctata.*

M. media (intermediate). A synonym of *M. fistulosa media.*

M. menthæfolia (Mentha-leaved). A synonym of *M. fistulosa mollis.*

M. mollis (soft). A synonym of *M. fistulosa mollis.*

M. oblongata (oblong). A synonym of *M. fistulosa.*

M. punctata (dotted). *fl.*, calyx-teeth spreading, hardly longer than the width of the villous orifice of the tube; floral leaves and bracts whitened or purplish, or both, often slender-acuminate. Summer. Stem usually 2ft. high. SYN. *M. lutea.* (A. B. R. 546; B. R. 87.)

M. purpurea (purple), of Loddiges. A synonym of *M. fistulosa rubra.*

M. purpurea (purple), of Pursh. A synonym of *M. fistulosa media.*

M. Russellianum (Russell's). *fl.* pale, veined with purple; bracts purplish. July to September. *l.* nearly sessile, lanceolate, roundly sub-cordate at the base, ciliated on the edges. Stem glabrous or ciliated on the angles. *h.* 2ft. to 3ft. 1823. (B. M. 2513; H. E. F. 130; S. B. F. G. 166.)

M. scabra (rough). A synonym of *M. fistulosa mollis.*

MONARDELLA (a diminutive of *Monarda*). ORD. *Labiatæ.* This genus comprises about eleven species of hardy, annual or perennial, pleasantly aromatic, fragrant herbs, much resembling *Monarda* in aspect and inflorescence, natives of North-west America. Flowers in terminal and solitary verticillate heads, subtended or involucrate by broad, often membranous and coloured bracts; corolla red, rose-purple, or rarely white. Leaves mostly entire. For culture, *see* **Monarda.**

M. candicans (whitish). *fl.* white; calyx-teeth short, rather broad and obtuse, villous both sides; bracts minutely pubescent outside, ovate, greenish along the numerous nerves, at least the tip and margins white-scarious, shorter than the flowers. *l.* lanceolate or narrowly-oblong, obtuse, tapering into a slender petiole. *h.* 1ft. 1853. Annual.

M. macrantha (large-flowered). *fl.* scarlet, with a long tube and a five-parted limb; heads close, terminal, about 2in. long. Autumn. *l.* stalked, ovate. 1877. A handsome and highly aromatic perennial, with a creeping rootstock, and tufted, procumbent or ascending stems. (B. M. 6270.)

MONESES (from *monos*, single, and *esis*, delight; alluding to the pretty and solitary flower). ORD. *Ericaceæ*. A monotypic genus, the species being a small, stemless, very glabrous, stolon-bearing, hardy, perennial herb. It is sometimes erroneously classed under **Pyrola** (which *see* for culture).

M. uniflora (one-flowered). *fl.* white or pink, ¾in. in diameter, terminal on the one or two-bracted scape; calyx five- (rarely four-) parted, persistent; petals five, rarely four, orbicular, sessile. June. *l.* ½in. to 1in. long, radical, petiolate, persistent, serrulate, coriaceous. Central and Northern Europe (Britain), North America, and Japan. SYN. *Pyrola uniflora* (under which name it is figured in Sy. En. B. 900).

MONEYWORT. *See* **Lysimachia Nummularia.**

MONEYWORT, CORNISH. *See* **Sibthorpia europæa.**

MONILIFORM. Formed like a necklace; that is to say, with alternate swellings and contractions, resembling a string of beads.

MONIMIA (after Monime, the wife of Mithridates). ORD. *Monimiaceæ*. A genus consisting of three species of shrubs, natives of the Mascarene Islands. Flowers small, dicœcious, shortly cymose, in the axils. Leaves opposite, entire, coriaceous, often softly pubescent. The species are not grown in this country.

MONIMIACEÆ. An order of rarely climbing, often fragrant, trees or shrubs, natives of the warmer parts of Asia and America, the Mascarene Islands, Australia, and the Southern Islands of the Pacific. The order is divided into two tribes—i. *Monimieæ*, ii. *Atherospermeæ*. Flowers cymose or racemose, rarely solitary, small or medium; inflorescence axillary, or rarely terminal, shorter than the leaves. Leaves opposite, or rarely alternate, entire, or irregularly serrate, coriaceous, or rarely membranaceous, penniveined; stipules none. *Monimiaceæ* possess a tonic and stimulating volatile oil in all their parts; and the succulent fruit of some is edible. There are about twenty-two genera and 150 species. Examples are: *Laurelia*, *Monimia*, and *Peumus*.

MONIZIA. Included under **Thapsia** (which *see*).

MONKEY FLOWER. *See* **Mimulus luteus.**

MONKEY PUZZLE. A common name for **Araucaria imbricata** (which *see*).

MONK'S-HOOD. *See* **Aconitum.**

MONNINA (named after Monnino, Count de Flora Blanca, a Spanish promoter of botany). SYN. *Hebeandra*. ORD. *Polygaleæ*. A genus comprising about fifty species of greenhouse evergreen herbs, shrubs, or small trees, natives of Western America. Flowers usually with a white or yellowish corolla and blue calycine wings; disposed in spike-formed, terminal or lateral racemes. Leaves alternate or scattered. Few of the species have any horticultural value. For culture, *see* **Polygala.**

M. obtusifolia (obtuse-leaved). *fl.* drooping; corolla of five reddish-purple petals, united into one hollow keel, disposed in solitary terminal racemes. June. *l.* obovate, obtuse, entire, 1in. long, attenuated into a short petiole. *h.* 12ft. Peru, 1830. A slender, upright shrub. (B. M. 3122.)

M. xalapensis (Xalapa). *fl.* bright blue, in copious racemes; tip of the three-lobed keel yellow. *l.* alternate, oblanceolate, acute or acuminate, bright green, 2in. to 4in. long. Mexico, 1879. A rather effective shrub. (B. M. 6415.)

MONOCERA. Included under **Elæocarpus** (which *see*).

MONOCHÆTUM (from *monos*, one, and *chaite*, a bristle; in allusion to the shape of the connective of the stamen). ORD. *Melastomaceæ*. A genus comprising about twenty-three species of erect, branched, often tomentose or pubescent, greenhouse shrubs and sub-shrubs, natives of the mountains of Peru, New Grenada, Venezuela, Mexico, and Guatemala. Flowers violet or purple, paniculate, sometimes in fours; calyx tube campanulate, lobes four; petals four, obovate. Leaves ovate

Monochætum—*continued.*

or lanceolate, five to seven-nerved. The species are of easy culture, thriving best in a compost of two parts good fibrous peat, one of light loam, and one of leaf mould. Propagated by cuttings, placed in sandy peat, under a glass, in heat.

M. alpestre (rock).* *fl.* bright red, solitary, terminal, 1½in. to 2in. across. *l.* very shortly stalked, rather obtuse, broad or ovate-lanceolate, three to five-nerved; margin obscurely sinuate-crenate, and ciliated. Mexico. A small, compact, much-branched shrub, the young growths more or less tinged with red.

M. dicranantherum (dicranantherous). A synonym of *M. Hartwegianum*.

M. Hartwegianum (Hartweg's).* *fl.* bright rose-colour, the upper half of the plant, or more, consisting of a series of small flowering panicles, collectively forming an oblong large panicle, mixed with a few leaves. Winter. *l.* shortly-stalked, elliptic-lanceolate, rigid, bright green above, pale beneath. Andes. A beautiful dwarf shrub. (B. M. 5506, under name of *M. dicranantherum.*)

M. Humboldtianum (Humboldt's).* *fl.* rich reddish-purple, produced in great abundance; square stems and calyces beautifully tinged with vivid red. *l.* bright green, oblong-acuminate, five to seven-nerved. October to December. Caraccas, 1863. (B. M. 5367.)

M. Lemonianum (Lemon's). *fl.* deep rich violet rose. Winter and early spring.

M. sericeum multiflorum (many-flowered silky).* *fl.* rich mauve, produced in great profusion during the early spring months. A garden variety.

M. tenellum (delicate). *fl.* rich purple, disposed at the ends of the branches and branchlets in few-flowered cymes, rarely solitary. October. *l.* oblong-ovate, acute, five-nerved; margin ciliate-setose. Guatemala.

MONOCHILUS (from *monos*, one, and *cheilos*, a lip; alluding to the form of the flower). ORD. *Verbenaceæ*. A monotypic genus, remarkable for the form of its corolla. The species is a pretty, low, stove herb. It thrives in a compost of loam, peat, and sand. Propagated by cuttings inserted under a bell glass, in bottom heat.

M. gloxinifolius (Gloxinia-leaved). *fl.* white, disposed in terminal elongated racemes, solitary in the axils of the bracts, shortly pedicellate; calyx campanulate, shortly five-fid; corolla tube cylindrical, oblique above, scarcely enlarged, cloven at back; limb very oblique. *l.* alternate or almost opposite, rather large, membranous, repand-toothed. Brazil, 1838.

MONOCHLAMYDEOUS. Having but one floral envelope.

MONOCHORIA (from *monos*, one, and *chorizo*, to separate; the anterior stamen is different from the remaining five). ORD. *Pontederiaceæ*. A genus comprising about half-a-dozen species of stove aquatic herbs, inhabiting the East Indies, China, Japan, the Malayan Archipelago, and tropical Australia and Africa. Perianth campanulate, with distinct segments; tube none; racemes sometimes sheathed with the cauline leaves, very short, with the flowers numerous, rather long-stalked, fascicle-formed, sometimes longer, rather lax or almost spike-formed; pedicels very short; spathe complicated, at the base of the raceme or in the sheath at the base of the peduncle. Radical leaves long, cauline ones shorter, petiolate; blade sagittate, cordate-ovate, or lanceolate. The species here described are probably the only ones yet introduced. For culture, *see* **Pontederia.**

M. hastata (spear-shaped). *fl.* blue, in crowded umbels; perianth six-cleft; spathe oblong, opening sideways. July. *l.* arrow-shaped, obtuse or pointed. *h.* 2ft. East Indies, 1806. (A. B. R. 490, under name of *Pontederia dilatata.*)

M. vaginalis (sheathed). *fl.* blue, mostly rufous outside; spike distant-flowered, sometimes sub-campanulate; pedicels longer than the flowers. Summer. *l.* long-stalked, mostly cordate or cordate-ovate, more or less distinctly acuminate. *h.* 2ft. Eastern Asia, &c.

M. v. Korsakowii (Korsakow's). *fl.* violet, large, scarcely rufous outside; inflorescence paniculate or sub-paniculate, few-flowered. Summer. *l.* variable, usually very broadly rotundate-cordate. *h.* 1ft. or more. A showy plant. (R. G. 1862, 374.)

MONOCOTYLEDONS, or ENDOGENS. One of the two great classes into which all flowering plants are divided. They may be characterised as follows: Stem with the wood forming longitudinal bundles, irregularly

Monocotyledons, or Endogens—*continued.*

disposed, not in concentric layers, and having no defined central pith. Leaves with usually parallel veins; exceptions to this character are not uncommon amongst *Aroideæ*, *Dioscoreæ*, and *Liliaceæ*. Flowers with the organs mostly in threes or fours, never in fives; in grasses, the parts are arranged in twos and threes. Embryo with a single cotyledon; first-formed leaves alternate; radicle not branching, but throwing out adventitious roots.

MONODORA (from *monos*, one, and *dora*, a skin; in allusion to the fruit being one-celled). ORD. *Anonaceæ*. A small genus (three species) of stove trees, confined to tropical Africa. Flowers variegated, large, pendulous, solitary or long-pedunculate, terminal or opposite the leaves. Fruit large, globose, woody, containing a number of seeds, closely packed in pulp. *M. Myristica*, the only species yet introduced, thrives in a light sandy loam. Propagated by ripened cuttings, inserted in sand, under a glass, in moist heat.

M. Myristica (Nutmeg). Calabash Nutmeg. *fl.*, outer petals bright yellow, variegated with purple spots; inner whitish, and downy on the outside, shining and pale yellow, with crimson spots, inside. *fr.* somewhat similar to nutmegs. *h.* 20ft. 1843. The seeds abound in an aromatic oil, of nutmeg flavour; and the entire fruit is very like a small calabash. (B. M. 3059.)

MONŒCIOUS. Having one sex in one flower, and the other in another, on the same plant.

MONOGRAMME (from *monos*, one, and *gramma*, writing; referring to the sori arranged in a single row on the narrow fronds). Including *Pleurogramme*. ORD. *Filices*. A genus comprising about ten species of small, grass or rush-like, stove plants, the simplest in structure of all the Ferns. Sori linear, close to the midrib on one or both sides. The species are of no horticultural value.

MONOGYNOUS. Having but one style, although many carpels may be present.

MONOLENA (from *monos*, one, and *olene*, the arm; alluding to the arm or process from the base of the anther). ORD. *Melastomaceæ*. A genus comprising four or five species of fleshy, stemless, glabrous, stove herbs, with thick rhizomes, inhabiting the woods of Peru and New Grenada. Flowers flesh-coloured, large, in scorpioid cymes, shortly pedicellate; calyx tube turbinate, trigonal; lobes five, ovate, obtuse; petals five, elongated obovate-spathulate, obtuse; scapes slender. Leaves long-stalked, oblong, cordate or orbiculate, entire or denticulate. The undermentioned is a very handsome species, and the only one yet introduced. It thrives in a compost of sandy loam and peat or leaf mould, and requires a moist atmosphere. Propagated by division, or by cutting up the short thick rhizomes into pieces, and starting them in bottom heat.

M. primulæflora (Primula-flowered). *fl.* deep bright pink, with a white eye and yellow anthers, 1in. in diameter; petals obovate or obcordate; peduncles two or three-flowered. November. *l.* 4in. to 6in. long, elliptic, acuminate; margins sinuate-toothed, ciliate; upper surface bright glossy green, lower and petiole red-purple. *h.* 6in. Columbia, 1069. SYN. *Bertolonia primulæflora* (of gardens). (B. M. 5818.)

MONOLOPHUS. Included under **Kæmpferia** (which *see*).

MONOLOPIA (from *monos*, one, and *lopos*, covering; referring to the structure of the involucre). ORD. *Compositæ*. A small genus (two species have been described) of pretty, hardy, woolly, annual herbs, natives of California. Flower-heads yellow, radiating, solitary, terminal; involucral scales in a single row; receptacle convex, naked. Leaves alternate, sessile or amplexicaul, entire or dentate. The culture is very simple, any ordinary garden soil being suitable. Propagated by seeds, sown in April, in a light soil.

M. major (greater). *fl.-heads* yellow. July. *l.* narrow, entire, or scarcely toothed. *h.* 2ft. California, 1834. A very showy plant, white or whitish with floccose wool, but sometimes glabrate and green. (B. M. 3839.)

MONOMERIA (from *monos*, one, and *meris*, a part; in reference to the single anther). ORD. *Orchideæ*. A small genus (two species) of stove epiphytal orchids, with abortive petals and a wide toothleted interval between the upper and lower sepals; they are allied to *Bulbophyllum*. The two species, *M. barbata*, from India, and *M. nitida*, from Mexico, are probably not now in cultivation.

MONOPANAX (from *monos*, one, and *Panax*; the plant resembling a *Panax*, and having a one-celled ovary). ORD. *Araliaceæ*. A genus founded by Regel on the plant here described. It is an ornamental, smooth-growing, dwarf stove shrub, with erect, simple stems, becoming leafless below. For culture, *see* **Aralia.**

M. Ghiesbreghtii (Ghiesbreght's). *fl.* greenish-white, in small, round, long-stalked heads, on a terminal, pyramidal, racemiform panicle. *l.* long-stalked, digitate, bright green, composed of from four to seven lanceolate-oblong, acuminate, leathery, entire, stalked leaflets. Mexico, 1869. SYN. *Aralia Ghiesbreghtii* (of gardens). (R. G. 606.)

MONOPETALOUS. A term applied to those flowers in which all petals are more or less united. More correctly termed *Gamopetalous*.

MONOPHYLLOUS. Having only one leaf, or several leaves united by their edges into one.

MONOPSIS. This genus is included, by Bentham and Hooker, as a section of **Lobelia** (which *see*).

MONOSEPALOUS. Having only one sepal. More correctly *Gamosepalous*.

MONOTHYLACEUM. A synonym of **Hoodia** (which *see*).

MONOTOCA (from *monos*, one, and *tokos*, a birth; the edible fruit having only one seed). ORD. *Epacrideæ*. A genus comprising about half-a-dozen species of greenhouse evergreen shrubs or small trees, natives of East and South Australia. Flowers white, small, usually unisexual, disposed in racemose, axillary or terminal spikes, rarely solitary, sessile; corolla tube small, campanulate or scarcely cylindrical; lobes five or rarely four, valvate in bud. Leaves scattered, with recurved margins or nearly flat. The species described below are those best known to cultivation. For culture, *see* **Epacris.**

M. elliptica (elliptic). *fl.* white; spikes erect, nearly terminal and aggregate, or axillary and solitary. May to August. *l.* elliptic-oblong, four times longer than broad. *h.* 8ft. 1802. A small tree.

M. lineata (lined). A tall shrub or small tree, resembling *M. elliptica* in foliage; but the peduncles are shorter, axillary, and few-flowered, the flowers smaller, and the corolla more open. *h.* 6ft. 1804. Shrub.

M. scoparia (broom). *fl.* white; spikes axillary, few-flowered, nearly sessile, nodding. May to August. *l.* oblong-linear, with revolute edges. Stems erect. *h.* 5ft. 1825. Shrub.

MONOTROPEÆ. An order of leafless herbs, parasitic on the roots of trees, principally Pines and Beeches, natives of the temperate regions of the Northern hemisphere. Flowers dirty white or pinkish, scented or inodorous, solitary, spicate, racemose. Leaves replaced by alternating scales. There are nine genera, and from ten to twelve species. Examples are: *Hypopithys* and *Pterospora*. *Hypopithys multiflora* (*Monotropa Hypopithys*), an interesting plant, is the only representative of the order in the British Flora. Like all the rest of the order, it is difficult to establish in gardens; the only way is to sow the seeds under Beech or Fir-trees.

MONSONIA (named after Lady Ann Monson, a correspondent of Linnæus). ORD. *Geraniaceæ*. A genus comprising about a dozen species of ornamental greenhouse herbs or sub-shrubs, of which four are natives of North-eastern Africa and tropical Western Asia, and the rest South African. Flowers regular; sepals and petals five, imbricated; peduncles axillary, one-flowered or umbellately many-flowered. Leaves alternate or opposite, stipulate, toothed or dissected. The species thrive in a sandy-loam soil, with a small quantity of peat and leaf

Monsonia—*continued.*

mould added. Propagated by seeds, sown in a slight hotbed, in spring; or by cuttings, inserted in sandy soil, under a handlight, in spring or autumn. The species here described are probably the only ones yet introduced.

M. lobata (lobed). *fl.* variegated with purple, red, white, and greenish on the outside, but pale bluish, with a darker base, inside; peduncles long, one-flowered, furnished with six or eight whorled bracts in the middle. Spring. *l.* cordate, five to seven-lobed; lobes blunt, serrated, pilose beneath. *h.* 1ft. Cape of Good Hope, 1774. Sub-shrub. (B. M. 385.)

M. speciosa (showy).* *fl.* rose-coloured, with a purple eye, greenish outside, large. Spring. *l.* palmately five-parted, with the segments finely bipinnatifid. *h.* 6in. Cape of Good Hope, 1774. Sub-shrub. (B. M. 73.)

MONSTERA (derivation unexplained by Adanson, who gave the generic name). SYNS. *Serangium, Tornelia.* ORD. *Aroideæ* (*Araceæ*). A small genus (about twelve

FIG. 585. MONSTERA DELICIOSA.

species have been described) of curious and ornamental stove evergreen climbers, all natives of the West Indian Islands and tropical America. Spathe deciduous; spadix deciduous, female flowers below, hermaphrodite ones above; stamens of the upper flowers with flattened filaments, and two-celled anthers, opening by a short lateral slit. Leaves stalked, entire or perforated with holes, ultimately divided at the margin; petioles sheathed at the base. Monsteras thrive well if planted out on a well-drained mound of rich soil, against the damp wall of a stove, to which they firmly attach themselves by their long aerial roots. It is only in large structures that they can be allowed to develop at will; in smaller houses, they do well in pots. They are readily propagated by cutting up the stems.

M. Adansonia (Adanson's). *fl.* yellow, white; spathe boat-shaped. May. *l.* obliquely ovate-cordate, pertuse. West Indies, 1752. (B. M. 5086.)

M. deliciosa (delicious-fruited). *fl.* yellowish. Summer. *fr.* succulent, with a luscious pine-apple flavour. *l.* large, perforated in a singular manner, leathery. Mexico. A handsome plant for sub-tropical gardening. SYNS. *Philodendron pertusum, Tornelia fragrans.* See Fig. 585.

MONTAGNEA. A synonym of **Montanoa** (which *see*).

MONTANOA (called after Montano, a Mexican politician). SYNS. *Eriocarpha, Eriocoma,* and *Montagnea.* ORD. *Compositæ.* This genus comprises about fourteen species of shrubs, sometimes arborescent, rarely suffruticose, natives of North America, ranging from Mexico to Columbia. Flower-heads white, or sometimes pink, heterogamous, in corymbose panicles; ray-florets sterile; achenes glabrous, the hypogynous disk sometimes so

Montanoa—*continued.*

much developed as to resemble a cup-shaped pappus. Leaves opposite, entire, dentate, or broadly lobed; lower ones sometimes large, pinnatifid. Montanoas thrive in good fibrous loam, and succeed best in the cool conservatory. Propagated by seeds, sown in gentle bottom heat, in spring, and the seedlings gradually hardened off; or by cuttings of roots, inserted in autumn, and of the stems or shoots, in spring. These latter must be placed in a close, heated frame. *M. bipinnatifida* makes a striking plant for summer sub-tropical gardening.

M. bipinnatifida (bipinnatifid).* *fl.-heads* yellow, in the apices of the branches, heterogamous; ray-florets ligulate; disk-florets tubular, funnel-shaped; receptacle convex, scaly. *l.* opposite, petiolate, bipinnatifid; lower ones pinnatifid, rigid, pilose; segments serrate. *h.* 6ft. to 8ft. Mexico. SYNS. *M. heracleifolia, Polymnia grandis, P. heracleifolia.* See Fig. 586. (R. H. 1863, 370.)

FIG. 586. MONTANOA BIPINNATIFIDA.

Montanoa—*continued.*

M. heracleifolium (Heracleum-leaved). A synonym of *M. bipinnatifida.*

FIG. 587. FLOWERING BRANCH OF MONTANOA MOLLISSIMA.

M. mollissima (very soft). *fl.-heads*, disk yellow; ray white. August to October. *l.* oval-lanceolate, sessile, deep dull green above, silvery-white and hairy beneath. A handsome branched shrub. Mexico. See Fig. 587.

M. tomentosa (tomentose). *fl.-heads* white, in compound corymbs; throat of corolla campanulate, about equalling the tube. September. *l.* cordate, oblong, toothed, tomentose, acute. *h.* 3ft. Mexico, 1828. (S. B. F. G. ser. ii. 44, under name of *Eriocoma fragrans.*)

MONTBRETIA. Now included under **Tritonia** (which *see*).

MONTEREY CYPRESS. *See* **Cupressus macrocarpa.**

MONTEZUMA (named after Montezuma, King of Mexico in the fifteenth century). ORD. *Malvaceæ.* A monotypic genus. The species is a very showy stove evergreen tree, with a spreading habit. It thrives in a compost of sandy loam and lumpy peat. Propagated by cuttings of rather firm shoots, inserted in sand, under a glass, in bottom heat.

M. speciosissima (very showy). *fl.* purplish-scarlet, large, with five somewhat sinuated petals; pedicels one-flowered, rising from the branches beneath the leaves. *l.* smooth, cordate, acute, entire, stalked. *h.* 30ft. Mexico, 1827.

MONTRICHARDIA (named after Gabriel Montrichard, of Trinidad). ORD. *Aroideæ* (*Araceæ*). A genus comprising three or four species of stove aquatic or marsh plants, natives of tropical America. Spathe thick, broad, ovate, acute, erect, convolute at base; spadix shorter than the spathe, sessile, acute, erect, thick, obtuse; inflorescence very dense, cylindrical. Leaves coriaceous, sagittate. Stems trunk-like. *M. linifera*, the only species yet introduced, thrives in a rich loamy soil, submerged, and in a moist atmosphere. Propagated by seeds, or by divisions of the rootstock.

M. linifera (thread-bearing). *fl.* greenish-yellow. *l.* stalked, sagittate-cordate; lobes rather acute. *h.* 3ft. to 12ft. Bahia, 1860.

MOON DAISY. A common name for *Chrysanthemum Leucanthemum.*

MOON FLOWER. A common name for *Chrysanthemum Leucanthemum.* The name is also applied to *Anemone nemorosa* and *Stellaria Holostea.*

MOON SEED. *See* **Menispermum.**

MOONWORT. *See* **Botrychium.**

MOQUILEA (from the name of one of the species in Guiana). ORD. *Rosaceæ.* A genus comprising about eighteen species of trees and shrubs, mostly natives of Brazil; they are also found in Guiana, Venezuela, the Trinity Islands, and Guadaloupe. The powdered bark of *M. utilis* (the Caraipi or Pottery-tree of Para), baked with an equal quantity of clay, makes vessels for domestic use capable of withstanding a great amount of heat. The species have no horticultural value.

MORÆA (named after R. Moore, an English botanist). Including *Vieusseuxia.* ORD. *Irideæ.* A genus comprising about forty species of hardy, or nearly hardy, bulbous plants, mostly natives of the Cape of Good Hope. They are closely allied to *Iris.* Flowers lilac or yellow, usually very brilliant, sweet-scented; perianth with three broad spreading or reflexed outer segments, and three narrower inner ones; stamens three, distinct; style slender, bearing three petal-like bifid or merely multifid stigmas opposite the stamens. Leaves few, narrow. The following is a selection of the species best known to cultivation; they are natives of the Cape, except where otherwise stated. Some of the species make very beautiful objects, when planted out in the cool conservatory. For culture, &c., *see* **Iris.**

M. bicolor (two-coloured). *fl.* yellow; outer perianth segments with a dark blackish-brown blotch at the base; scape erect, many-flowered, branching. Summer. *l.* pale green, narrow, ensiform, about 2ft. long. *h.* 2ft. (B. R. 1404; L. B. C. 1886, under name of *Iris bicolor.*)

M. bituminosa (bituminous). *fl.* yellow. April and May. *l.*, lower ones spirally twisted. Stem smooth. Branches viscid. *h.* 1ft. 1787. (B. M. 1045.)

M. bulbifera (bulb-bearing). A synonym of *M. ramosa.*

M. crispa (curled). *fl.* blue; segments spreading, the alternate ones smaller. May and June. *l.* about the length of the scape. *h.* 6in. 1803. (B. M. 759 and 1284.)

M. edulis (edible).* *fl.* violet; outer segments of the perianth with a yellow spot at the base. May. *h.* 4ft. 1792. (B. M. 613.)

FIG. 588. INFLORESCENCE AND FLOWER OF MORÆA IRIDOIDES.

Moræa—*continued.*

M. iridoides (Iris-like). *fl.* white, with yellow or brown spots. July. *h.* 6in. 1758. See Fig. 588.

M. papilionacea (butterfly-like). *fl.* varying from red to pale blue, spotted with dark blue. May. *l.* pubescent, all the segments spreading. *h.* 3in. to 6in. 1795. (B. M. 750.)

M. ramosa (branched). *fl.* golden-yellow, about 2in. in diameter. May. *l.* ensiform. Stems rigid, flexuous, leafy. *h.* 2ft. to 3ft. 1792. (B. M. 771.) SYN. *M. bulbifera* (B. M. 5785).

M. Sisyrinchium (Sisyrinchium). *fl.* purple or blue; tube filiform, very long. May. *h.* 6in. Mediterranean region, Orient, 1597. (B. M. 1407.) SYN. *Xiphion Sisyrinchium* (B. M. 6096).

M. spathacea (sheathed). *fl.* sweet-scented; perianth limb bright yellow; outer segments obovate-oblong, obtuse, 1½in. long, marked at the top of claw with a circle of purple lines; inner segments oblanceolate, rather shorter; pedicels 2in. to 3in. long. March. *l.*, developed ones not more than one to a stem, firm in texture, green, ensiform, 6in. to 24in. long, ¾in. broad, deeply channelled down the face, tapering to a long point; undeveloped ones numerous, scarious, dark brown, sheathing the outside of the tufts, the stems, and proper leaves. Stem terete, about 1ft. high, two or three-flowered. 1875. Plant rhizomatose. (B. M. 6174, under name of *Dietes Huttoni.*)

M. tricuspis (trident-petaled).* *fl.* pale greenish-white, with purple spots at the base of the outer segments; corolla rather large, with cuneate, concave claws; laminæ much longer than these, ovately rounded; inner segments equal to the claws of the outer. May. Stem simple, or occasionally with one or even two branches. *h.* 1ft. 1776. SYN. *Vieusseuxia tricuspis.* (B. M. 696.)

M. tripetala (three-petal-like). *fl.* bluish; outer segments of corolla sub-spathulate, divaricately patent; inner segments exceedingly small, shorter than the claws of the outer ones, patent. June. *h.* 1ft. 1802. SYN. *Vieusseuxia tripetaloides.* (B. M. 702.)

M. tristis (dull-coloured). *fl.* brown. May and June. *l.* very smooth. Stem, branches, and peduncles villous. *h.* 1ft. 1768. (B. M. 577.)

M. unguiculata (long-clawed).* *fl.* whitish, spotted with purplish-red; outer segments obovate, sub-acute, as long as the narrow claws; inner segments small, tridentate-partite. June. *h.* 1ft. 1802. SYN. *Vieusseuxia unguicularis.* (B. M. 593.)

MORCHELLA. *See* **Morel.**

MOREÆ. A tribe of *Urticaceæ.*

MOREL. This is the name given to a group of Fungi included in the genus *Morchella.* The species

FIG. 589. MOREL (MORCHELLA ESCULENTA).

grow chiefly in woods. Several species are distinguished, all of them edible; and some of them are regarded as great delicacies. They have a stalk, supporting a

Morel—*continued.*

head, which is rounded, oval, or conical, and externally very much wrinkled, and folded irregularly (see Fig. 589). In this surface are sunk numerous small bladders (asci), in each of which lie eight minute oval spores. The various kinds differ in proportions of stalk and head, but most are between 2in. and 12in. in height.

FIG. 590. LONGITUDINAL SECTION OF MORCHELLA ESCULENTA.

The general form and appearance are shown in Fig. 590, which represents the Common Morel (*Morchella esculenta*). This is one of the Fungi most esteemed for its excellent qualities. Its stem is 1in. to 3in. high, and the cap is 2in. or 3in. across. In colour it varies from yellowish to ash-grey. Its substance is somewhat firm, hence it can be easily dried and kept for winter use. In Germany, it is believed that Morels grow best in ground upon which forests have been burned, and this led to frequent burning the forests, till such actions were made severely punishable by law.

The Morel is used either fresh or in a dried state, much in the same manner as Truffles. It has not been subjected to cultivation, but specimens gathered when quite dry will keep for several months. They should not be collected in a wet state.

MORENIA. Included under *Chamædorea.*

MORETON BAY CHESTNUT. *See* **Castanospermum.**

MORICANDIA (named after M. E. Moricand, 1780-1854, an Italian botanist, author of "Flora Veneta"). ORD. *Cruciferæ.* A genus comprising five species of very pretty, hardy, annual or biennial, glabrous or pilose herbs, natives of South Europe, North Africa, and Western Asia. Flowers purple or rose, large; sepals erect. Pods often elongated, on upright pedicels. Leaves entire, and amplexicaul or pinnatisect. The species thrive in any light soil. Seeds should be sown, in the open ground, during spring, in a warm, dry situation.

M. arvensis (cornfield). *fl.* of a beautiful violet. Spring and summer. Pods somewhat tetragonal. *l.*, cauline ones cordate, stem-clasping, quite entire. *h.* 1ft. South Europe, 1739. Biennial. (B. M. 3007; S. B. F. G. iii. 278.)

Moricandia—*continued.*

M. Ramburii (Rambur's). *fl.* purple; calyx with the sepals erect, two opposite ones deeply bisaccate, two other opposite ones longer, and tapering to a mucronate point; racemes terminal, many-flowered. *l.* large, glaucous-green; lower ones largest, broadly obovate, petiolate; cauline ones gradually smaller and sessile. Stem 1ft. to 2ft. high, suffruticose below. Spain. Biennial. (B. M. 4947.)

FIG. 591. UPPER PORTION OF PLANT, RADICAL LEAF, AND FLOWER OF MORICANDIA SONCHIFOLIA.

M. sonchifolia (Sonchus-leaved).* *fl.* pale violet-blue, very showy, in terminal racemes, 1in. in diameter. March. *l.* sessile, acutely auricled at base; radical ones soon withering, lyrate-pinnatisect, sinuate-serrate; cauline ones obovate-oblong, subacute, sinuate-serrate. *h.* 1ft. to 2ft. China, 1876. Annual. See Fig. 591. (B. M. 6243.)

MORINA (named after Louis Morin, 1636-1715, a French botanist). SYN. *Asaphes.* ORD. *Dipsaceæ.* A genus comprising about eight species of glabrous or softly pubescent, hardy or half-hardy, perennial herbs, with the habit of *Carduus.* They are natives of Central and Western Asia. Flowers crowded in whorls in the axils of the floral leaves; corolla pink, long, tubular, ringent. Leaves oblong, sinuated, dentately spinose, rarely quite entire. The species thrive best in a little shade, and when sheltered from high winds. A sandy loam is most suitable. Propagated by dividing the roots, as soon as the plants have done flowering; the divisions then become established before winter sets in. The young plants should be placed in permanent quarters, and shaded, with leafy branches, for a fortnight. The two species described below are probably the only ones introduced.

M. Coulteriana (Coulter's).* *fl.-heads* pale yellow, in terminal spikes; bracts connate into a broad cup, rigidly spinous. *l.* narrow, spine-margined. *h.* 6in. to 18in. Western Himalaya, 1884. Hardy. (B. M. 6734.)

Morina—*continued.*

FIG. 592. FLOWERING STEM OF MORINA LONGIFOLIA.

M. longifolia (long-leaved).* *fl.-heads* white whilst in bud, changing to a delicate pink, and ultimately becoming a lovely crimson, 1in. long, and ⅜in. across, disposed in crowded whorls in the axils of the upper leaves. June and July. *l.* about 1ft. long, 1¼in. wide, pinnatifid, with wavy margins, somewhat spiny-ciliated. Stem terete, not furrowed. *h.* 2ft. Nepaul, 1839. Hardy. See Fig. 592. (B. M. 4092; B. R. xxvi. 36.)

MORINDA (from *Morus*, a Mulberry, and *Indica*, Indian). Indian Mulberry. SYN. *Sphærophora* (of Blume). ORD. *Rubiaceæ.* A genus comprising about forty species of stove, erect or scandent, glabrous or rarely pubescent shrubs or trees, all natives of the tropics. Flower-heads usually white, long or shortly pedunculate; calyx tube urceolate, or hemispherical; limb short, truncate or obscurely dentate, persistent; corolla funnel-shaped or salver-shaped; tube short; throat glabrous or pilose; limb usually five-lobed, coriaceous, valvate. Fruit fleshy, consisting of the berries of the several flowers in a head, united into one compound berry. Leaves opposite, rarely three or four in a whorl. The species best known to cultivation are those here described. For culture, *see* **Hamelia.**

M. bracteata (bracteate). *fl.* pure white, disposed in small heads; corolla with a very villous throat; peduncles solitary. May. *l.* oblong, shining, on short petioles. India, 1816. A small tree.

M. citrifolia (Citron-leaved). *fl.* white, disposed in small heads; peduncles short, opposite the leaves, bractless. *fr.* combined into an ovate mass, creamy-white. *l.* oblong, attenuated at both ends, shining. Branches tetragonal. Tropical Asia, Australia, 1793. A small tree.

M. jasminoides (Jasmine-like).* *fl.* pale buff; peduncles axillary, forked, bearing two leaves and two capitula, each of from

Morinda—*continued.*

two to five flowers. April. *fr.* orange-coloured. *l.* lanceolate or elliptic, entire, shortly acuminated, sometimes undulated, with or without foveolated blotches in the axils of the nerves. Australia, 1833. A variable shrub. (B. M. 3351.)

M. tinctoria (dyer's). *fl.* pure white, with a Jasmine-like fragrance, in oval heads; peduncles opposite the leaves, solitary, much longer than the petioles. June. *fr.* green, like that of *M. citrifolia*. *l.* oblong, almost sessile, smooth, but not shining, from 6in. to 10in. long. India, Malay Archipelago, &c., 1826. The bark of the root of this species is used to dye red. Tree.

MORINGA (from *Muringo*, the Malabar name of *M. pterygosperma*). SYNS. *Anoma*, *Hyperanthera*. ORD. *Moringeæ*. This genus is the only one of the order (which *see* for characters). The species thrive in a sandy loam, with the addition of a little peat and leaf mould. Propagated, in May, by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in heat.

FIG. 593. PORTION OF INFLORESCENCE OF MORINGA APTERA.

M. aptera (wingless). *fl.* pale yellow, in axillary panicles, 9in. to 12in. long. Capsules about 1ft. long. *l.* 1ft. or more in length, with or without a few scattered obovate or oblanceolate leaflets, ⅓in. to ⅔in. long. *h.* 15ft. to 20ft. Nile Land, Upper Egypt, Syria, and Arabia. An oil is expressed from the seeds, and is largely employed in the manufacture of perfumery. See Fig. 593.

M. pterygosperma (winged-seeded). Horse-radish Tree. *fl.* pale yellow, the upper petal whitish. *l.* sub-pinnate. *h.* 20ft. India, 1759. The root of this tree, when young, is scraped, and used by the natives as the Horse Radish is in Europe.

MORINGEÆ. This order contains but a solitary genus—*Moringa*. Unarmed trees, inhabiting tropical Asia, Northern Africa, and the West Indies. Flowers irregular, in axillary panicles; calyx five-partite, with oblong sub-equal segments, imbricate in bud; petals five, inserted on the calyx, linear-oblong, the two posterior rather the longest, ascending, imbricate in bud. Leaves two or three, impari-pinnate; leaflets very caducous; stipules deciduous. There are only three species.

MORISONIA (named after Robert Morison, 1628-1683, born at Aberdeen, at one time Director of the Royal Botanic Garden at Blois, and afterwards Professor of Botany at Oxford). ORD. *Cappariderœ*. A small genus (four species) of stove unarmed trees, natives of the West Indies and tropical South America. Flowers large or small; corymbs axillary and terminal, many-flowered. Berry globose. Leaves petiolate, simple, coriaceous, shining, glabrous, tomentose, or scaly. *M. americana*—probably the only species in cultivation—thrives in a compost of loam, peat, and sand. Propagated, in spring, by cuttings of the ripened shoots, inserted in sandy soil, under a glass, in bottom heat.

M. americana (American). *fl.* white, somewhat tufted; corymbs shortly-stalked, few-flowered. Berry 1½in. to 2in. in diameter. *l.* oblong, 4in. to 6in. long, glabrous, stalked, alternate, simple, bluntish; petiole thickish, often 1in. long. Branches and inflorescence leprous. *h.* 15ft. West Indies, 1824.

MORMODES (from *mormo*, a goblin; referring to the strange appearance of the flowers). ORD. *Orchideæ*. A genus comprising about fourteen species of stove orchids, inhabiting Columbia and Central America, as far as Mexico. They are allied to *Catasetum*, but are distinguished by the want of cirrhi upon the column, the lip being membranous, turned upwards, and often somewhat saddle-shaped; and the pollen-masses being four in number, connate in pairs, fixed to a thick caudicle, which adheres to a fleshy gland. Leaves elongate, plicate, veined. The species are more curious than ornamental. For culture, *see* **Catasetum.**

M. atropurpureum (dark purple).* *fl.* dark purple-brown, or between chocolate and blood-colour; sepals and petals ovate-lanceolate; lip porrected, velvety, with short hairs, tapering below into a stipes. October. *h.* 1ft. Panama, 1834. (B. M. 4577; B. R. 1861.)

M. buccinator (trumpeter).* *fl.* pale reddish-brown, everywhere sprinkled with dark-coloured dots; sepal and petals oblong-acute, with margins singularly recurved; lip large, fleshy, with revolute side, almost like the flaps of a saddle; column shorter than the lip. April. *l.* 9in. long, lanceolate, membranous, striated. *h.* 1ft. to 1½ft. Central America. (B. M. 4455, under name of *M. lentiginosum*.)

M. Cartoni (Carton's). *fl.* numerous, in a rather long oblong spike; sepals and petals yellow, streaked longitudinally with red, similar in shape and size, much spreading, almost reflexed; lip equal to the petals, but twisted, also pale yellow, with a few interrupted streaks; columns slightly oblique. July. *l.* three or four, 1ft. or more long. *h.* 1ft. Santa Martha. (B. M. 4214.)

M. colossus (colossal). *fl.* from 5in. to 6in. across; sepals and petals narrow-lanceolate, spreading or reflexed, pink at the base, passing into yellow at the tips; lip ovate, bright yellow; raceme many-flowered. *l.* elliptic-ovate. Central America, 1870. (B. M. 5840.)

M. Greenii (Green's). A synonym of *M. uncia*.

M. igneum (fiery). *fl.* red, purple. January. *h.* 2ft. Central America, 1852.

M. lentiginosum (freckly). A synonym of *M. buccinator*.

M. lineatum (lined). *fl.* dull olive-green, increasing with maturity in intensity of colouring; lip variable, but always covered with loose, straggling hairs. March. Guatemala, 1836. (B. R. xxviii. 43.)

M. luxatum (dislocated). *fl.*, sepals and petals creamy-white; lip of the same colour, with stripes of brown in the centre; peduncle many-flowered. July. *l.* broad. Mexico, 1842. A handsome species. (B. R. xxix. 33.)

M. Ocanæ (Ocana).* *fl.* dark orange-yellow, closely speckled with red-brown spots, about 3in. in diameter when spread out; sepals and petals concave, spreading; lip with a long claw; racemes six to ten-flowered. October. *l.* 1ft. long by 1½in. broad, narrowly-lanceolate, acuminate. Pseudo-bulbs elliptic-oblong. Columbia, 1879. (B. M. 6496.)

M. pardinum (panther-spotted).* *fl.*, sepals and petals bright yellow, spotted with rich brown. July. Mexico, 1837. A handsome species, rarely seen in cultivation. (B. M. 3900.)

Mormodes—*continued.*

M. p. unicolor (whole-coloured). *fl.* deep lemon-yellow, in many-flowered racemes; sepals and petals ovate, acuminate, concave; lip cuneate, with three acuminated lobes, the two lateral ones smaller and reflexed; scape 1ft. and more long. September. *l.* lanceolate, membranous, strongly striated. (B. M. 3879.)

M. uncia (uncial). *fl.* whitish externally, 2½in. in diameter; inner surface of perianth pale yellow, covered with dark red spots; base of lip dark purple, the inner surface yellow, with red streaks; column green inside, curved; raceme large, pendulous, many-flowered; powerfully aromatic. June. *l.* narrow-lanceolate, 1ft. to 1½ft. long. Pseudo-bulbs somewhat two-edged. Mexico, 1869. (B. M. 5802, under name of *M. Greenii.*)

M. Williamsii (Williams'). *fl.* creamy-white, sweet-scented; spikes twelve to fifteen-flowered. Mexico. A handsome species.

MORNA. Included, by the authors of the "Genera Plantarum," under **Waitzia** (which *see*).

MORNING GLORY. A common name for the genus *Ipomœa.*

MORONOBEA (from Moronobo or Coronobo, the Caribbean name of *M. coccinea*). ORD. *Guttiferæ.* A genus comprising but one (or perhaps two) species. *M. coccinea* is a tall tree, with the habit of *Platonia.* It requires a compost of sandy loam and moderately rough leaf mould. Propagated by cuttings of the ripened shoots, inserted, with the leaves intact, in sand, under a bell glass, in heat.

M. coccinea (scarlet). Hog Gum-tree. *fl.* white, large, terminal, solitary, hermaphrodite; sepals five, imbricated; petals five, much exceeding the calyx. May. *l.* oblong, acute at both ends, with an incurved point, coriaceous, dotless. *h.* 40ft. Guiana, 1825. A fluid pellucid juice issues from incisions in the trunk, which hardens into a valuable medicinal resin. It is said that, in Jamaica, hogs, when injured, rub themselves against the tree, in order to become smeared with the juice—hence the common name.

MORPHIXIA. Included under **Ixia** (which *see*).

MORUS (the old Latin name for the Mulberry). Mulberry. ORD. *Urticaceæ.* Some ten or twelve species have been referred, by various authors, to this genus; these may probably be reduced to about five. They are milky-juiced, mostly hardy deciduous trees or shrubs, extending over the temperate regions of the Northern hemisphere, and also found on tropical mountains. Flowers greenish-white, inconspicuous, unisexual, borne in separate, axillary, catkin-like spikes. Fruit oblong, juicy, composed of numerous egg-shaped, compressed achenes covered by the enlarged succulent calyces. Leaves alternate, toothed, entire or three-lobed, three-nerved at base; stipules lateral, small, caducous. *M. alba* and *M. rubra* grow well in almost any rather dry soil, the latter being the hardier of the two. Propagated freely by cuttings, which may be inserted in a shady border in spring or autumn. The species here given are those best known to cultivation, and are all hardy. For cultivation of *M. nigra, see* **Mulberry.**

M. alba (white). White Mulberry. *fl.* greenish-white. May. *fr.* white or pale red; ripe in September; inferior to the Black in flavour, being less brisk and sharp. *l.* with a deep scallop at the base, and either cordate or ovate, undivided or lobed, serrated with unequal teeth, glossy; basal sinus equal. *h.* 20ft. to 30ft. Asia, 1596 (naturalised in many countries). There are a great many varieties of this species, those grown in Lombardy and other parts of Italy being the most esteemed. In Europe, the White Mulberry is most generally cultivated for its leaves, which are used for feeding silkworms.

M. nigra (black). Common Black Mulberry. *fl.* greenish-white. June. *fr.* oblong, red or black; ripe in August. *l.* cordate, bluntish, or slightly lobed with about five lobes, unequally toothed, rough. *h.* 20ft. to 30ft. Orient, 1548. This species is cultivated on account of its very wholesome and refreshing fruit; and also for the leaves, which are used for rearing silkworms. (B. M. Pl. 229; W. D. B. ii.159.) *See also* **Mulberry.**

M. rubra (red). *fl.* greenish-yellow. July. *fr.* red, long, pleasant to the taste; ripe in September. *l.* cordate-ovate, acuminate, three-lobed or palmate, serrated with equal teeth, rough, somewhat villous; under surface very tomentose and soft. *h.* 40ft. to 70ft. Northern United States, 1629.

MOSCHARIA (from *Moschos,* Musk; alluding to its fragrance). SYNS. *Gastrocarpha, Mosigia.* ORD. *Compositæ.* A monotypic genus, similar in habit to *Sonchus,*

Moscharia—*continued.*

with the involucre of five or six spreading leafy bracts, and the pappus consisting of very short lanceolate, ciliate, chaffy scales. The species is an erect, hardy annual, of easy culture in ordinary soil. Seeds should be sown in April, in a gentle heat, and the plants transferred to the open borders in May or June.

M. pinnatifida (pinnatifid). *fl.-heads* white, in loose panicles at the apices of the branches, shortly pedunculate; involucre sub-globose; receptacle small, convex. July. *l.* alternate, pinnatifid. *h.* 6in. Chili, 1823. (B. R. 1564; S. B. F. G. 229, under name of *Gastrocarpha runcinata.*)

MOSIGIA. A synonym of **Moscharia** (which *see*).

MOSSES (*Musci*). These are well-known to everyone, at least as regards their general appearance. They possess distinct leaves and stems, the latter bearing below root-hairs, which act as roots for their benefit. All parts of the plants are made up of cells, without vessels among them; but some cells are long, and form a kind of central thread in the stem, and also a midrib in each leaf. Mosses vary in size from a little over ⅛in. (*Buxbaumia*) to several feet in length of stem (*Fontinalis*), but usually range between ½in. and an inch or two high. The leaves are always small, and are usually numerous. If the life history of any Moss be traced out, it will be found to be nearly as follows, if we commence with one of the minute one-celled spores. The spore pushes out a fine filament, which branches, and forms buds here and there on the branches; each bud grows larger, and forms a plant with stem and leaves. On this plant, at certain periods, grow parts that correspond in use to the young seeds (ovules) and the pollen of flowering plants. From their union, there results the so-called fruit of the Moss, or the capsule, usually supported on a stalk. The capsule, with its stalk, is really a new plant, imbedded by the base in the leafy plant, and nourished by absorbing sap from it. The capsule has usually a rod of tissue running up its centre, with a space all round between this and the sides, and in this space are formed the spores. When the spores are ripe, they are set free, either by slits formed in the sides of the capsule, or, more often, by a lid (operculum) falling off. Below this lid, there is usually a row (at times two rows) of membranous teeth, always in multiples of four, forming the peristome. In the classification of Mosses, considerable stress is laid on the nature of the peristome, and of its teeth.

Uses. The direct uses of Mosses to mankind are very few. In gardening operations "Moss" is largely used to maintain moisture around plants in pots, &c., or epiphytes, such as many tropical Orchids. This is a Sphagnum, or Bog Moss, a genus of which numerous species and varieties occur in Britain. Its peculiar power of absorbing moisture is due to many of the outer cells having openings into them, so as to permit free ingress and egress of the water, which is sucked up by the Moss, just as in a sponge. Sphagnum is also an excellent material for packing fragile articles which it is necessary to send, by train or by other means, to a distance. The various kinds of Sphagnum love low, swampy ground; they aid much in the formation of peat. Other uses of Mosses are but few and unimportant. Brushes are at times made of the stems of Hair Moss (*Polytrichum*).

Injuries. Direct injuries to man from Mosses are even fewer than direct benefits; but harm in gardens may result from Moss on trees, and on gravel walks, or on the soil of gardens, lawns, &c. Moss on gravel walks generally indicates damp sub-soil; good drainage is therefore essential for its prevention. If it appears, it may be kept within bounds by loosening the surface. Watering with a solution of copper sulphate (blue vitriol), or of corrosive sublimate, is useful if the walk is not of large extent. Moss on garden soil, and on lawns, is very hurtful in crushing out the plants that are of use, or are

Mosses—*continued.*

ornamental. Mosses do not thrive well in fully-drained soils, hence the drainage ought to be at once seen to when these plants begin to be troublesome in gardens. The soil may advantageously be top-dressed with lime, or with mixtures of lime and sulphur, or of soot and salt, or with compounds of ammonia, *e.g.*, ammonium sulphate (½lb. to 1 gallon of water). Mosses and Lichens on trees may prove hurtful if closely covering the bark, since they keep it too moist, thus promoting the growth of parasitic Fungi under their shelter; and this may result in the death of the branches. Mosses and Lichens may also give shelter to parasitic insects, especially to Aphides, and to various Larvæ during winter. The plants of Moss and Lichen themselves, probably, do not absorb any nourishment from the trees; yet, for the above reasons, they should be removed. This may be done by vigorous brushing after rain has fallen pretty heavily for some hours, as they are more loosely attached while soaked. The branches should be then well washed with a solution of soft soap and lime. Dead branches loaded with Lichens and Mosses should be removed. Newly-slaked lime may be scattered among the overgrowth with advantage. Excessive growth of such plants on branches of trees may be a good deal lessened by judiciously thinning plantations, and by pruning the individual trees, so as to insure free access of air and light.

MOTHER OF THOUSANDS. *See* **Linaria Cymbalaria.** The name is also applied to *Bellis perennis prolifera* and *Saxifraga sarmentosa.*

MOTH, FLAT-BODY. *See* **Flat-body Moth, Common.**

MOTHS (*Heterocera*). Under this name are denoted such of the order *Lepidoptera*, or scale-winged insects, as are not included among the Butterflies (*Rhopalocera*). (*See* **Insects** for the characters that distinguish *Lepidoptera* from other insects.) Butterflies are a far more uniform group than Moths, and differ from them in having the antennæ, or feelers, almost always clubbed at the tip, but elsewhere slender. *Rhopalocera* means club-horned. Their wings are usually folded back, when at rest, so as to display the lower surface, which often bears bright colours; and the body is usually slender. Moths, on the other hand, have the antennæ sharp-pointed, with no club, but otherwise variable, being branched, slender, feathery, or of some other form. *Heterocera* means varied-horned. Some have the body slender, and the wings folded, as in Butterflies, in which case, the lower surface is seldom conspicuously coloured; but usually the body of the insect is heavy, without marked distinction between the middle body (thorax) and the hind body (abdomen); and the wings are usually folded flat on the back, the hind wings being so folded, lengthwise, as to lie entirely below the narrower fore-wings when at rest. In almost all, the two wings on each side are connected by a bristle, or a tuft of stiff hairs, that projects from the front edge of the hind wing, and plays in a kind of socket or ring on the fore-wing. It is more difficult to state any constant differences between the caterpillars of Butterflies and Moths than between the perfect insects, though it is usually possible for a practised entomologist to distinguish the groups even in this stage; and so also with the pupæ.

Moths are of far greater practical importance than Butterflies, for the caterpillars of several species do very serious injury to fruit-trees, to potherbs, and to other cultivated plants. It is possible to ward off, or at least to lessen, the evil done by such species in some cases; but in others the insects are so well protected in the leaves, or other parts of plants, as to render remedial measures practically hopeless; and the affected parts, or the entire plants, must be destroyed to prevent extension of the injury.

Moths—*continued.*

There is usually little difficulty in recognising the caterpillars of *Lepidoptera*, the only other group of insects in which somewhat similar larvæ are found being the Sawflies, among the *Hymenoptera*. But, while they retain a strong general likeness, they yet vary exceedingly in many points, such as the number of prolegs, or fleshy legs, on the hinder rings of the body; the colour and markings; and the skin, in some smooth, in others warty, or covered with hairs, bristles, or long spines. Nor are they less varied in their habits and modes of life, though, with few exceptions, they feed on, or in, living plants. The larvæ of a great majority of the Butterflies, and those of many Moths, live on the surface of the leaves, or other organs of their food-plants, exposed to full view. Frequently, such exposed larvæ are brightly coloured; but, on experiment, it has often been found that they are distasteful to birds, because of unpleasant fluids thrown out by them, or of the hairs or spines on their bodies. The caterpillars of most Moths feed hidden from view in some way. The concealment is secured, by some, by hiding below the soil, or in crevices, during the day, and crawling out to feed only during night. Others roll up leaves, or spin two or more together, and feed in shelter of the cover so formed; while others combine to form large webs (*see* **Hawthorn Caterpillars**), in which they lie, and feed protected. Many others bore into the roots or stems of plants (*see* **Leopard Moth**), or between the surfaces of leaves (*see* **Leaf Miners**), and thus find food, as well as protection. A few others, chiefly small kinds, prefer dead and dried vegetable or animal products, such as corn, peas, woollen cloths, bees' combs, &c.; and these are frequently very troublesome in houses.

The methods of remedying injuries caused by larvæ of Moths, and of preventing future attacks, must depend largely on the habits of the insects, both in the perfect and the larval stages of development. They are mentioned under **Insects** (which *see*), and under special tribes or genera, noted below. Moths pass through a complete metamorphosis. The larvæ seek out safe retreats in which to become pupæ, or chrysalides. These retreats may be in crevices, or in the galleries made by them in the plants; or among dead leaves; or under the soil, in earthen cells, lined with silk. Less often they spin a silken cocoon, in some exposed situation, and trust to this covering for their protection. The pupæ are defenceless, with the limbs all firmly bound down to the body by a hard shell or coating of chitine. The only power of motion they possess is that of wriggling some of the hinder rings of the body. In the pupa-case the Moth becomes fully developed; it then bursts the case, along the front half of the back, and crawls out, with the wings small and soft at first. But these organs at once begin to grow, and in an hour or two they reach their full size, and soon become firm, and fit for flight.

The females of various kinds of Moths (*see* **Hybernia**) never have the wings useful for flight; but in them the wings remain small, or may even be entirely absent. Moths form several well-marked tribes; though these grade into one another in such a way that it is difficult, at times, for a beginner to distinguish to which tribe certain individuals belong. The more reliable distinctive characters of the groups are noted below.

Most kinds of Moths can be reared with comparative ease, from the larval state, in confinement; hence, the life-histories of these insects are far more thoroughly known than those of any other group. But it would be beyond the scope of this work to enter on the methods of rearing, capturing, and preparing Moths for permanent preservation, despite the interest of such pursuits.

Moths are divided into two great sections: the *Macro-*

Moths—*continued.*

lepidoptera (meaning large scale-winged insects), seldom under 1in. across the outspread wings, and often much larger; and the *Microlepidoptera* (or small scale-winged insects), seldom exceeding 1in. across the wings (except in *Pyralidina*), and often much smaller. In both sections there are numerous species that injure cultivated plants. Each section includes several tribes, which are generally more or less characterised by the habits of the larvæ, as well as by peculiarities in the structure of the perfect insects. The following are the more important tribes and families:

1. *Sphingina*, or the Hawk Moth tribe, including the true Hawk Moths, the Humming Bird Hawk Moths (*see* **Macroglossa stellatarum**), and the Clear-wing Moths.

FIG. 594. HUMMING BIRD HAWK MOTH.

They all have long, narrow, front wings (see Fig. 594), which they move rapidly; and fly in a peculiar fashion. They have a long proboscis, or trunk; and their antennæ are thick in the middle, and taper to both ends. The larvæ of the true Hawk Moths are seldom very hurtful to garden plants,

FIG. 595. DEATH'S HEAD MOTH.

though that of the Death's Head Moth (Fig. 595) feeds on Potato, on Jasmine, and on *Lycium barbarum*; that of the Privet Hawk Moth on Privet, and those of the genus *Smerinthus* on Willows, Poplars, Apple, Lime, &c. They often have a straight or curved horn, or tail, at the end of the body. The Clear-wing Moths, as larvæ, live in burrows, in the roots and stems of many plants, and often do considerable damage—*e.g.*, *Sesia tipuliformis* in Currant branches, and *S. apiformis* (see Fig. 596) in Poplars.

2. The tribe *Bombycina* includes a considerable number of Moths, usually of large size, with heavy bodies. Their wings are relatively weak, so that they—at least, the females—are not very active on the wing, and the females of some kinds are practically wingless. They usually have the proboscis small, and hardly fit for

Moths—*continued.*

sucking up food. The males often have the antennæ feathered largely on both sides; the antennæ of the females, on the other hand, are usually slender. They mostly fly by day, and are often brightly coloured. The larvæ are very frequently hairy and brightly coloured.

FIG. 596. CLEAR-WING MOTH.

Many of them are very hurtful to garden produce. The Silkworms (*i.e.*, larvæ that produce silk for their cocoons in such quantity as to be of commercial importance) belong to this tribe, and chiefly to the genera *Bombyx* and *Saturnia*. *Bombyx mori* is the common Silkworm Moth. Among the many species of this tribe that might be noted, we shall here mention only a few, concerning which fuller information will be found under the respective names. They are: Brown-tail, Gold-tail, and Gipsy Moths (*Liparis*, see Figs. 597 and 598); Lackey Moth (*Bombyx neustria*, see Fig. 599), Tiger Moths (*Arctia caja* and *A. villica*, see Fig. 600), and Vapourer Moth (*Orgyia antiqua*, see Fig. 601).

Nearly related to the true *Bombycina*, and often included among them, are the Ghost Swifts (*Hepialidæ*), of which the commonest species (*Hepialus humuli*) feeds, in the larval state, in the roots of many plants, and is at times very hurtful to the Hop. The larvæ are smooth, and dull ochreous in colour. The moths have very short, slender antennæ. Closely allied to the *Hepialidæ* are the *Zeuzeridæ*, represented by the Goat Moth (*Cossus ligniperda*) and the Leopard Moth (*Zeuzera æsculi*); the larvæ of both feed in the wood of trees. The *Notodontidæ*, or *Pseudo-bombyces*, are frequently separated off as a family distinct from the true Bombyces, from which, however, they differ in no very important respect. The larvæ of this family are frequently of very strange forms, with humps, or warts, or long filaments at the tip of the body, as in the Puss Moth. They mostly live on trees, and the only species among them that is common enough to be injurious to any extent is the Buff-tip Moth (*Pygæra bucephala*), which feeds on almost any of our native, as well as on many cultivated, trees.

FIG. 597. GIPSY MOTH (MALE)

3. The next great tribe is *Noctuina*, or Night Moths, so called because of their generally flying by night. In this tribe the antennæ are almost always slender; the

Moths—*continued.*

front wings are rather narrow, the hind wings broad, and folded lengthwise. On each front wing are usually two spots, the inner round (orbicular stigma), the outer kidney-shaped (reniform stigma); and there are often two or more light cross lines. The hind wings are frequently

FIG. 598. GIPSY MOTH (FEMALE).

unspotted (see Fig. 602). The body is usually thick and heavy. The colour of the whole insect is usually dull, though often the markings are very elegant when examined closely. A few *Noctuæ* are brightly coloured, or bear metallic spots on the wings. The larvæ are usually smooth-skinned and dull in colour, or are marked with bright lines, and spots occasionally. They generally

FIG. 599. LACKEY MOTH.

have five pairs of prolegs, though, in a few genera (*Plusia*, &c.), the middle pairs of prolegs are small, or absent, forming a transition to the next tribe. Many of the larvæ are most hurtful to garden produce. They usually go underground to change into pupæ. *See* **Mamestra, Noctua, Plusia,** and **Potherb Moths.**

4. The *Geometrina*, or Looper Moths, are readily distinguished from all others, except the few *Noctuæ* men-

FIG. 600. TIGER MOTH.

tioned above, by the larvæ being long and slender, and moving in a peculiar manner, known as looping. This is caused by the fact that the middle pairs of prolegs are useless, or are entirely wanting. Usually only the pairs on the last two rings of the body are present, and the caterpillar, in moving along, has to bring the hinder extremity forward before fixing it and pushing forward the anterior part with the three pairs of true legs. Every step thus throws the body into a loop. The moths resemble butterflies in their slender bodies, and in the size and form of the wings, as well as in their usual attitude when at rest. The proboscis in them is usually small, or wanting. The antennæ are slender, or may be

Moths—*continued.*

comb-like in the males. The colours are mostly dull, often with very elegant lines or bars, but with neither stigma on the wings; a few are bright in colour. In a few genera, the females are nearly, or quite, wingless. The pupæ are usually concealed underground, in earthen cells. The larvæ usually feed exposed, or may spin leaves together, to obtain protection against danger from without. The Looper Moths are far less widely hurtful than the *Noctuæ*, yet several species may be found referred to more at length under **Gooseberry or Magpie Moth, Hybernia,** and **Winter Moth** (which *see*).

A knowledge of many of the *Microlepidoptera*, despite their very small size, is of great importance to gardeners, since they injure extremely the leaves and other parts of plants. The three great tribes of this group are as follows:

FIG. 601. VAPOURER MOTH.

1. *Pyralidina.* In this tribe are contained the largest of the *Micros*; but they seldom do much injury to garden produce, hence they need not be dwelt on here. They frequently approach small *Noctuina* in habit and appearance.

2. *Tortricina*, or Leaf Roller Moths, are a very numerous group of small Moths, ¼in. to 1in. in spread of wings. The front wings are broad, with the front margin close to the base peculiarly arched; and one overlaps the other when folded. In colour, the front wings are frequently green, brown, rusty-brown, yellow, &c.,

FIG. 602. POTHERB MOTH.

or are marked with peculiarly elegant spots or lines. Their palpi are short and inconspicuous; their larvæ are like those of *Noctuina*, save in size, and possess, generally, five pairs of prolegs. They live, for the most part, between leaves, spun together, or rolled into tubes. *See* **Leaf Rollers.** The larvæ are very agile, dropping from their tubes at once when a bird tries to catch them there. Many of them are more or less injurious

FIG. 603. CODLIN MOTH.

to trees, and to cultivated plants, *e.g.*, the Codlin Moth (*Carpocapsa pomonana*, see Fig. 603), and the genus *Tortrix*.

3. *Tineina* is a tribe of very wide numerical extent. It includes the smallest of the Moths, some of the species being extremely minute. They differ from *Tortricina* in having narrow wings, with long hind fringes; a slender body; proboscis very small, or absent; palpi long, prominent, and ascending; and the hind feet customarily long, and furnished with spurs; eyes naked. These Moths vary extremely in colour, their beauty of colouring under a microscope, being frequently unsurpassed in insects. The larvæ are usually smooth, or nearly so, and of the ordinary form. They vary much in number of prolegs; five pairs is their usual number, but, in a few, there are six ill-formed pairs; in others, there are four pairs; and others are almost footless. The larvæ also vary

Moths—*continued.*

very much in their habits, some feeding exposed, others in rolled, or in mined leaves, or in clothes; and a good many make, and carry around, neat cases, for their protection from injury. Some kinds do considerable injury to the crops and to trees; but the *Tineina*, as a whole, are far more injurious to field crops than to gardens. The pupæ are usually protected, as in *Tortricina*, in a web, or cocoon, spun by the larvæ among their food. *See* **Hawthorn Caterpillars.**

Pterophorina and *Alucitina*, or the Plume Moths, are small Moths, in which each wing is divided, lengthwise, into from two to six segments, or "plumes," resembling small feathers. They are of small size, and do little harm to cultivated plants, or to field produce in general.

MOTTLED UMBER MOTH. *See* **Hybernia.**

MOULD. This term is frequently used, very vaguely, to denote a large number of microscopic Fungi that agree in being filamentous in structure, and in having the spores usually borne on the tips of certain branches, sometimes scattered, at other times crowded in masses, the arrangements of which are of importance in affording means of distinguishing the various kinds of Moulds. The Fungi included under the name are exceedingly numerous, and belong to widely different groups. Many of them live on decaying remains of animals, or of plants that remain damp; indeed, it is scarcely possible to prevent their growth in food, clothes, and other household articles in damp houses. But, in addition, many kinds also grow upon living plants, and are most destructive at times in their attacks upon certain of them; *e.g.*, *Peronospora infestans*, on Potatoes; *P. gangliformis*, on Lettuce, &c. Only these latter kinds very greatly concern gardeners. The injurious kinds will be found treated of under the headings of the plants injured by them.

Moulds are often divided into two groups, viz., the Black (*Dematiei*), having the threads dark because of thickened cell-membranes; and the White (*Mucedines*), which have no thick cell-membranes, and cannot always be clearly distinguished from the Mildews (*see* **Mildew**). It is to the White Moulds that the more harmful kinds belong, particularly to the genus *Peronospora*. A good many of the Moulds, we have reason to believe, are only earlier stages of Fungi that belong to groups more complex in structure when mature; whilst a considerable number have the power of producing spores that, when lying in fluid which contains sufficient food, resemble the Yeast Fungus in appearance, in the mode of forming new cells, and in causing fermentation in the fluid if it contains fermentable substances. Good ventilation, and prevention of overcrowding, are essential in diminishing the risk of injury from Moulds to greenhouse subjects. Direct applications to plants containing parasites inside their tissues are useless, since the parasite cannot be reached, and the host-plant itself suffers. It is advisable to destroy diseased plants by fire, if practicable; and seed should not be taken from these. Plants of dry soils are less liable to damage from injury by Fungi than are those in damp situations. Lastly, the healthier the subject, as distinct from mere luxuriance, the less likely will it be to suffer injury from the growth on it of Moulds.

MOULDING, or **EARTHING-UP.** The process of adding or drawing soil round the base of certain plants, more especially kitchen garden crops, either for the purpose of blanching their stems, or for insuring a greater depth above the roots, and in the limited space occupied by them in comparison with the tops. Moulding, or Earthing-up, is invariably attended with good results when practised amongst Beans, all the plants of the *Brassica* tribe, Peas, Potatoes, &c. It is usually performed when the different subjects have become established, and are growing freely.

MOUNTAIN ASH. *See* **Pyrus Aucuparia.**

MOUNTAIN AVENS. A garden name of **Dryas octopetala** (which *see*).

MOUNTAIN EBONY. *See* **Bauhinia.**

MOUNTAIN HOLLY. *See* **Nemopanthes.**

MOUNTAIN PARSLEY FERN. *See* **Cryptogramme.**

MOUSE-EAR CHICKWEED. *See* **Cerastium.**

MOUTAN PÆONY. *See* **Pæonia Moutan.**

MOVING PLANT. *See* **Desmodium gyrans.**

MOWING MACHINES. *See* **Lawn Mowers.**

MUCILAGE. A turbid, shiny fluid.

MUCRO. A small, sharp point.

MUCRONATE, MUCRONULATE. Abruptly terminated by a hard, sharp point.

MUCUNA (its Brazilian name). SYNS. *Carpopogon*, *Macroceratides*, *Negretia*, and *Stizolobium*. Including *Macranthus*. ORD. *Leguminosæ*. A genus comprising about twenty-two species of herbs, or tall or rarely short and erect twining shrubs, chiefly inhabiting tropical Asia and America, a few tropical African, and one from the Fiji Islands. Flowers purple, red, or greenish-yellow, showy, in axillary racemes. Leaves pinnate, trifoliolate, often stipellate. The species are but rarely seen under cultivation, except in botanic gardens. They are strong-growing climbers, requiring to be planted out in good loam, in some warm house, and the long shoots trained near the glass. Propagated by cuttings of half-ripened young wood, inserted under a bell glass, in bottom heat; or by seeds. The pods of *M. pruriens* and *M. prurita* afford the Cowage, Cowhage, or Cow-itch of the Materia Medica.

M. imbricata (imbricated). *fl.* large; vexillum of corolla not half the length of the keel, varying from dirty white to purple; wings dark purple, shorter than the keel; keel cylindrical nearly to the end, where it curves upwards and terminates in a sharp spiny point; racemes large, thyrsiform, drooping, having the appearance of bunches of black grapes. Legume 3in. to 4in. long, about 1in. broad, bent at the extremities, covered with white hairs, which turn black in drying. *l.* ternate, trifoliolate, nearly glabrous above, silvery (with hairs) and prominently veined beneath. India. Stove. (B. M. 4945, under name of *M. prurita*. The true *M. prurita* is altogether a different plant.)

MUD PLANTAIN. *See* **Heteranthera reniformis.**

MUEHLENBECKIA (named after Dr. H. G. Muehlenbeck, 1798-1845, a Swiss physician.) SYN. *Sarcogonum*. ORD. *Polygoneæ*. A genus comprising about fifteen species of greenhouse or hardy, often climbing, shrubs or sub-shrubs, natives of Australia, New Zealand, the Pacific Islands, and extra-tropical South America, or the Andes. Flowers small, within sheathing fasciculate bracts; fascicles sometimes solitary in the axils, often in short, axillary or terminal, simple or paniculate, spikes or small racemes; perianth five-fid. Nut obtuse or acutely trigonal. Leaves alternate, petiolate, sometimes small and sub-orbiculate, sometimes large and cordate, deltoid, or sagittate. Only three species call for description in this work. *M. complexa* is a hardy climber of great beauty. It enjoys a sunny position, and well drained or sandy soil, and makes an effective subject for the upper and drier parts of the rockwork, where it forms a dense prostrate bush. In habit, it is dense and diffuse, and, from the distinct form and colour of its foliage, together with the graceful shape of the spray-like branches, it is most desirable and valuable for cutting purposes. All the species are propagated by cuttings, which should be taken in early summer, becoming thereby nicely rooted before winter sets in; the hardy ones may be put in any shady position out of doors (though a frame is preferable), and the greenhouse species planted in pots in heat.

M. adpressa (adpressed). *fl.* pink, small, in many-flowered, panicled spikes. Nut black, trigonous. *l.* ½in. to 2in. long, petioled, cordate or broadly oblong and truncate at base, obtuse,

Muehlenbeckia—*continued.*

acute, or apiculate, glabrous, in young plants trilobed. Australia, &c., 1822. A large, rambling, and climbing, leafy, greenhouse bush. SYN. *Polygonum adpressum* (under which name it is figured in B. M. 3145).

FIG. 604. MUEHLENBECKIA COMPLEXA.

M. complexa (embracing). *fl.* green, inconspicuous. August. *fr.* of a transparent wax-like substance, the tooth-like divisions glistening like miniature icicles, hanging in small clusters on lateral shoots from the more ripened stems. *l.* alternate, somewhat fiddle-shaped, distant. New Zealand, 1870. Hardy. See Fig. 604.

M. platyclada (flat-branched). *fl.* white, in lateral, few or many-flowered fascicles, sub-sessile. Blossoms almost throughout the year. Berries bright red, finally dark purple. *l.* membranous, hastate, oblong-lanceolate, or hastate-lanceolate. Branches leafless or sparsely foliate. Solomon Islands, 1863. A remarkable, glabrous, erect, greenhouse shrub. SYN. *Coccoloba platyclada* (under which name it is figured in B. M. 5382).

MUELLERA (named after Otto Frederick Müller, 1730-1784, a Danish botanist, and one of the editors of the "Flora Danica"). SYN. *Coublandia.* ORD. *Leguminosæ.* A genus comprising a couple of species of trees, the one inhabiting tropical South America, and the other (not much known) the hotter parts of Mexico. Flowers violet or whitish, in axillary or lateral racemes; calyx truncate, very shortly or obsoletely toothed; standard broad, ovate or sub-orbiculate, exauriculate. Leaves alternate, impari-pinnate; leaflets opposite, exstipellate. *M. moniliformis*, the species introduced to cultivation, is a tall, evergreen, woody, stove climber, differing from *Lonchocarpus* in the pod, which is thick, and of a dry, fleshy consistence. For culture, *see* **Lonchocarpus.**

M. moniliformis (necklace-podded). *fl.* whitish, disposed in simple, axillary racemes. *l.* impari-pinnate, with two pairs of ovate, acute, glabrous, petiolulate leaflets. Tropical America, 1782.

MUGWORT. A common name for **Artemisia vulgaris** (which *see*).

MUKIA (said to be the Indian name). ORD. *Cucurbitaceæ.* A small genus (one or two species) of stove, climbing, herbaceous plants, inhabiting Asia, Africa, and tropical Australia. *Mukia* is allied to *Bryonia*, but differs in the solitary or fasciculate female flowers, the campanulate calyx, the connective being produced at the apex, the spherical sessile berry, and the scrobiculate seeds. For culture, *see* **Momordica.**

M. scabrella (slightly scabrous). *fl.* yellow, small. *fr.* scarlet when ripe, ¼in. in diameter. *l.* entire or lobed, with simple tendrils. India, &c. An elegant little annual.

MULBERRY (*Morus nigra*). The Mulberry-tree has been an object of cultivation in Asia, and in some parts of Europe, from a very remote and, possibly, unknown period, not so much on account of its fruit as for the use of the leaves, which are celebrated for providing silkworms with food; silk, however, of superior quality is produced when the White Mulberry (*M. alba*) is the food-plant. The fruits are, however, very juicy when well ripened, and have a sub-acid flavour. They are occasionally used for dessert, and are also sometimes preserved, or made into a sort of syrup or wine. Many trees of large dimensions, and of a very great age, are to be found, as the Mulberry is extremely long-lived when planted in a deep, somewhat moist soil, and in a favoured situation. The first trees grown in England are stated to have been introduced in 1548, and planted in the gardens of Syon House. A great stimulus seems to have been given to Mulberry cultivation at the latter part of the sixteenth, and the beginning of the seventeenth, centuries, when, it is recorded, "Mulberry gardens were common in the neighbourhood of London; but, either from the climate, or the prejudices of the people, the growth of silk never prospered." In the same neighbourhood, at the present time, the tree succeeds and ripens its fruit well as a standard. Mulberries also thrive in all the more favourable parts of the country, but require a warm aspect and wall protection in the North of England, and in Scotland. It is questionable if the fruits are of sufficient merit, generally, to warrant such valuable space being devoted extensively to their cultivation. Where there is an orchard-house, a good-sized bush or standard tree may be grown in a tub or large pot, and excellent crops obtained, which will well repay for the protection afforded by their superior quality. The fruit does not keep long; consequently, the sooner it is used after becoming ripe, the better.

Propagation, &c. There are various methods by which the Mulberry may be propagated, namely, by seeds, by cuttings, and by layers; also by budding and grafting. Seeds should be washed from ripe fruits, thoroughly dried, and stored in bags, in a cool place, until spring; they may be sown under glass in March, or in the open ground in May. Except for obtaining stocks, this method is not much practised, as the plants are so long in reaching a size large enough for fruiting. Cuttings, 1ft. long, some two-year-old wood attached, should be taken from with well-ripened parts of the upper branches, either in early spring or in autumn, and be planted deeply, in a shady border, so that only about two eyes are left above ground. Even large branches themselves will root if inserted as deep as possible, and protected during winter. These latter should be kept steady and upright, by each being tied to a stake. Layering young branches is a common mode of propagation, also performed in autumn and spring, by any of the usual methods of layering that are available. Shield-budding is successfully practised on the Continent, in July and August, on stocks obtained either from seeds or cuttings. Grafting is also practicable, but is not much adopted, as the tree bleeds so much when cut. The Mulberry-tree succeeds in almost any good garden ground, but prefers a deep, rather light, and somewhat moist soil. In cold or wet situations, and in those which suffer much from drought, the fruits are liable to drop before getting fully ripened. When the trees are planted on lawns, or in orchards, and the ground beneath covered with turf, the fruits may be collected in a clean state, after being allowed to ripen so as to fall off; the latter are much sought after, and quickly devoured by birds. The Mulberry is amongst the latest of trees to burst into leaf in spring. The foliage is of a remarkable dark or bright green colour, in contrast with other trees in summer; and it is wholly destroyed by the first appearance of frost in autumn.

MULBERRY, INDIAN. *See* **Morinda.**

MULBERRY, PAPER. *See* **Broussonetia papyrifera.**

MULCHING. The process of applying various substances as a covering for soil above the roots of trees and plants, in order to prevent evaporation, and so preserve a uniform degree of heat and moisture. Mulching is also largely practised for other reasons, more particularly that of supplying a top-dressing of rich manure to established plants, so that its nutritive properties may be washed down by rain or artificial watering. All recently transplanted trees and shrubs, more especially fruit-trees, are greatly assisted by being provided with a Mulching of litter, half-rotted manure, leaves, or something of a similar description. This acts beneficially in retaining warmth and moisture, thus considerably neutralising the evil effects of drought, extreme cold or heat. Straw chaff, short litter, cocoa-nut fibre, and spent tan, are excellent non-conductors, where enriching properties are not required. For plants or trees needing help in summer, to perfect their flowers or fruits, a Mulching of fresh horse-dung, or good rotten manure, laid on the surface of the soil, and well watered occasionally, will often prove of immense permanent benefit.

MULGEDIUM. This genus is now included, by Bentham and Hooker, under **Lactuca** (which *see*).

MULLEIN. *See* **Verbascum.**

MULTIFARIOUS. Very numerous, or arranged in many rows.

MULTIFID. Cleft half-way into many parts.

MULTIPARTITE. Divided into many parts.

MUNDTIA named after Heinrich Mundt, a botanist of the seventeenth century). SYN. *Nylandtia.* ORD. *Polygaleæ.* A monotypic genus, the species being a small, much-branched, spinous, rigid, greenhouse shrub. It thrives in sandy peat. Propagated in May, by stiff young shoots, placed in sand, under a bell glass, in a cold frame.

M. spinosa (spiny). *fl.* white, with a red keel, small, sessile. January to May. *l.* scattered, spathulate, obtuse, rather mucronate. Branches smooth, spinescent at the apex, angular. *h.* 2ft. Cape of Good Hope, 1780.

MUNTINGIA (named after Abraham Munting, 1626-1683, at one time Professor of Botany in the University of Groeningen). ORD. *Tiliaceæ.* A monotypic genus, the species being a handsome, small, stove evergreen tree or shrub. A compost of sandy fibry loam and leaf mould, is suitable. Propagated by cuttings of half-ripened shoots, placed in sand, under a glass, in heat.

M. Calabura (Calabura). *fl.* white, 1in. in diameter, resembling those of the Bramble; pedicels in pairs, or sometimes in fours, axillary, one-flowered. June. *l.* sessile, oblique, semi-cordate at the base, lanceolate, villous beneath, 4in. to 5in. long. *h.* 12ft. to 25ft. Tropical America, &c., 1690. An infusion of the leaves is used as tea in Caraccas. (B. M. 5982.)

MURALTIA (named after John Von Muralt, 1645-1733, a Swiss botanist). ORD. *Polygaleæ.* A genus comprising about fifty species of greenhouse, densely-branched, small shrubs or under-shrubs, confined to South Africa. Flowers small, axillary, sub-sessile, solitary. Leaves few or fasciculate, small, rigid, often aciculate. *M. Heisteria,* the species best known to cultivation, is almost perpetually in flower under good treatment. It thrives best in a peaty soil, to which should be added plenty of sand. Propagated by cuttings of short young shoots, placed in sandy peat, under a hand glass. Similar culture will be suitable for the other species.

M. filiformis (thread-formed). *fl.* reddish, axillary, sessile, solitary, shorter than the leaves, rather distant, beardless. Flowering during the greater part of the year. *l.* alternate, somewhat remote, awl-shaped. *h.* 12ft. 1800. (A. B. R. 424, under name of *Polygala micrantha.*)

M. Heisteria (Heister's).* *fl.* purple, small, axillary, sessile. January. *l.* triquetrous, stiff, spiny at the apex, in bundles. Branchlets puberulous. *h.* 2ft. to 3ft. 1787. (P. M. B. iv. 150.)

Muraltia—*continued.*

M. stipulacea (stipuled). *fl.* red, lateral, beardless. June. *l.* ternate, linear, acute. *h.* 3ft. 1801. (A. B. R. 363, under name of *Polygala stipulacea.*)

MURICATE. Covered with short, sharp points.

MURRAYA (named after John Andrew Murray, 1740-1791, a Swedish botanist, once Professor of Medicine and Botany in the University of Gottingen, and a pupil of Linnæus). SYN. *Chalcas.* ORD. *Rutaceæ.* A small genus (about four species) of unarmed stove trees or shrubs, inhabiting tropical Asia and tropical and Western sub-tropical Australia. Flowers rather large, solitary, axillary, or disposed in terminal corymbs or in axillary cymes; calyx five-fid or five-partite; petals five, free, linear-oblong or ovate-lanceolate, imbricated. Berry small, one or two-seeded, oblong or ovoid. Leaves pinnate; leaflets petiolulate, cuneate at base or unequilateral, entire or obscurely crenulate. The species thrive in a compost of turfy loam and peat. Propagated by cuttings of ripened wood, which should be taken with leaves intact, and inserted in sand, under a bell glass, in moist bottom heat.

FIG 605. MURRAYA EXOTICA, showing Habit, and Flowering Branchlet (natural size).

M. exotica (foreign). *fl.* white, fragrant; peduncles many-flowered, corymbose. August. *fr.* red, roundish, one-seeded, *l.*, leaflets seven to nine, obovate, obtuse. *h.* 10ft. India, 1771. See Fig. 605. (B. R. 434.)

M. paniculata (paniculate). This is a mere form of the above, only differing in its fewer-flowered peduncles and more arboreous habit.

MURUCUJA. Included under **Passiflora** (which *see*).

MUSA (*Mauz* is the Arabic name of the genus, but Linnæus says he named it after Antonius Musa, the physician of Augustus). Banana, or Plantain-tree. ORD. *Scitamineæ.* Of this genus about eighteen plants have been described as species, but some of these are merely cultivated varieties. They are large-growing, stove, herbaceous plants, confined to the tropical regions of the globe. Flowers borne on a long nodding spike, clustered together in groups, protected by large, sometimes highly coloured bracts; calyx elongated, striated, the apex trifid, or three or five-toothed; corolla shorter than the calyx, or almost equal. Fruit fleshy. Leaves large, long. True stem very small; the sheaths of the leaves, however, are very long, and closely compacted, so as to form a kind of false stem. Musas are handsome foliage plants, available for culture in large pots or tubs when required to be movable, or they may be permanently planted in houses which afford sufficient heat and space for their development. Some of the hardier species, under the first-named treatment, may be utilised for sub-tropical gardening outside, in summer. *M. Ensete* and *M. superba* are two of the best and hardiest for the purpose. A sheltered position is

Musa—*continued.*

necessary, the leaves being so soon torn by rough wind. *M. coccinea*, a dwarf-growing slender species, with a brightly-coloured inflorescence, may be grown well in

FIG. 606. MUSA CAVENDISHII.

10in. pots for winter decoration of tropical houses. Musas require a strong loamy soil, with plenty of manure added, and almost any amount of heat and moisture may be given in summer. In winter, a resting season should be allowed, water being almost, or, in some case, entirely, withheld. Propagation may be effected by seeds, sown in heat, during spring; and most of the species produce suckers, which also afford a ready method of increase. The plants are sometimes cultivated for their fruits, but not extensively, on account of the great space, and the amount of heat required. *M. Cavendishii* is the most compact-growing species for this purpose, and the one which is, perhaps, most certain to succeed. Strong suckers must be obtained to start with, and grown on in pots until established. They should then be planted in a prepared bed of very rich soil, and encouraged to grow vigorously by maintaining a high temperature and humid atmosphere. The time taken in growing plants to fruiting size varies considerably according to the treatment given in cultivation. A stem which produces a bunch of fruits, dies away very soon afterwards, but one or more strong suckers usually proceed from the base before this takes place.

M. africana (African). *l.* oblong, petiolate, in the young plant about 3ft. long, spreading, of a bright green colour, the petiole purplish, with a narrow purple margin. Pseudo-stems also flushed with a purplish tinge, which is continued along the back of the prominent midrib. Angola, 1871. A very fine dwarf-habited species, with a sturdy growth.

M. assamica (Assam). *l.* crowded, tufted, elliptic-lanceolate, stalked, about 1ft. in length, very unequal-sided at the base, acute at the apex, and running out into a slender, tendril-like point; green, with a narrow purple border. Pseudo-stems slender, about 1½ft. high, green. Assam, 1871. A dwarf-habited and elegant plant, and an excellent subject for table decoration.

Musa—*continued.*

M. Cavendishii (Cavendish's).* *l.* deep green, oblong, 2ft. to 3ft. long, 1ft. to 2ft. wide. *h.* 5ft. to 6ft. China, 1829. A well-known dwarf-growing species, requiring less heat than many others. See Fig. 606.

M. coccinea (scarlet).* *fl.*, inflorescence terminal, about 1ft. long, furnished with spathes of a brilliant scarlet, tipped with yellow. Flowering at various times throughout the season. *l.* entire, oblong, about 3ft. long and 6in. broad, bright dark green. Pseudo-stem about 8in. in circumference. *h.* 4ft. Cochin China, 1793. A very ornamental plant. (A. B. R. 47; B. M. 1559; L. B. C. 475.)

M. Ensete (Ensete).* *l.* oblong, nearly erect, about 16ft. long and 4ft. wide, of a fine bright green, with a broad, bright crimson, stout midrib. Pseudo-stem usually very thick, attaining sometimes a diameter of more than 3ft. at the base, and a height of from 13ft. to nearly 20ft. Abyssinia, 1853. The best-known species in this country, being the hardiest and best adapted for sub-tropical gardening. (B. M. 5223.)

M. paradisiaca (Paradise). Adam's Apple Plantain. *fl.*, spadix nodding. *fr.* ascending, long-sub-cylindrical, incurved, 1in. long. *l.* oblong. Stem green. *h.* 20ft. Tropics, 1690. (L. B. C. 684.)

FIG. 607. MUSA ROSACEA, showing (1) Habit, (2) detached Young Infructescence, and (3) Cluster of Fruits.

M. rosacea (rosy). Mauritius Plantain-tree. *fl.*, spadix nodding or erect; male flowers deciduous; spathe elliptic, very obtuse. March. *fr.* oblong. *l.* oblong, unequal or obliquely cordate at the base. Mascarene Islands, &c., cultivated 1805. See Fig. 607. (B. R. 706; L. B. C. 615.)

M. sanguinea (bloody). *fl.* yellow; bracts blood-red. *l.* linear-oblong, 2½ft. long. Stem 3ft. to 4ft. high. Assam, 1872. (B. M. 5975.)

M. sapientum (wise men's).* True Banana. *l.* deep green, oblong, from 8ft. to 10ft. long, and 1ft. wide. *h.* 20ft. Tropics, 1729. There are a great number of varieties of this species, with the fruits varying much in form, colour and flavour; sometimes the large clusters weigh as much as 70lb. or 80lb. The fruit, which is eaten either fresh, cooked, or dried, is of the highest importance to the inhabitants of the tropics of both the Old and New Worlds. "Though less nutritious than wheat or potatoes, yet the space occupied by their culture, and the care required, are so very much less, that Humboldt has calculated the produce of Bananas compared to that of wheat as 133 to 1, and to that of potatoes as 44 to 1" ("Treasury of Botany").

M. s. vittata (striped).* *l.* with a bright green ground, beautifully striped and blotched with white. Tropical Africa, 1862. An elegant variety. (B. M. 5402.)

M. sumatrana (Sumatran).* *l.* oblong-lanceolate, acuminate, glaucous-green, prettily marked with transverse, oblong, more or less confluent, chestnut spots. Sumatra, 1880. (I. H. 375.)

M. superba (superb).* *l.* oblong. Pseudo-stem swollen at the base. *h.* 14ft. India, &c., 1820. A very distinct and handsome

Musa—*continued.*

species, resembling *M. Ensete*, only more compact. See Fig. 608. (B. M. 3849.)

M. velutina (velvety). *fl.* yellow, on an erect purple spadix: lower ones densely velvety. *l.* about 3½ft. long, and nearly 1ft. broad, unequal at base, decurrent on the petiole, which is 1½ft. long. Stems stout, 1½in. in diameter, and about 4ft. high. Assam, 1875. (R. G. 823.)

M. zebrina (zebra).* *l.* oblong, dark green, with broad blotches of bronzy-red and purple, irregularly scattered. Pseudo-stem slender. *h.* 10ft. India, 1820. A very distinct and desirable dwarf-growing species.

MUSCADINE. *See* **Vitis vulpina.**

MUSCARI (from *Moschus*, Musk; alluding to the smell of the flowers). Grape Hyacinth. Including *Botryanthus.* ORD. *Liliaceæ.* A genus of very pretty hardy bulbous plants, natives of Europe, North Africa, and Western Asia. A great many plants have been described as species, but probably not more than forty are really distinct. Flowers suffused with blue, or greenish-blue or white, pendulous or nodding, racemose; perianth small, tubular, globose, often constricted at the mouth, with small reflexed lobes; scape simple, leafless. Leaves radical, few, linear, rather fleshy. Bulbs tunicated. The species of Muscari are well adapted for planting in the mixed or shrubbery border, and for naturalising in sunny spots amongst short grass, &c. They succeed in almost any soil and situation, but increase most rapidly where the former is rich, and of a free, open description. Propagation is readily effected by means of offsets, and by seeds, which latter ripen freely. For obtaining offsets, the old bulbs should be lifted early in the autumn of every second year. When none are required, they may be left alone for a much longer period, and allowed to increase. An annual top-dressing of fresh soil may be given with advantage in early spring, before the flowering season commences.

Muscari—*continued.*

M. æstivale (summer). *fl.* yellow, with green ribs, the upper ones tinged with purple; scape 6in. to 8in. high, erect, pale green, mottled with purple below. June. *l.* bright green, long-linear, deeply concave. Native country unknown. 1877. (B. M. 6269.)

M. armeniacum (Armenian). *fl.* bright dark blue, with three small yellow dots near the mouth of the perianth, disposed in a dense spike about 2½in. long, very agreeably fragrant. May. *l.* concave, acuminated, 9in. long, ½in. broad. *h.* 6in. Armenia.

FIG. 608. FLOWERING PLANT AND DETACHED FLOWER OF MUSA SUPERBA.

M. botryoides (cluster-like).* *fl.* deep sky-blue, with six small white teeth or segments, disposed in a short, dense, almost globose cluster. Spring. *l.* linear, channelled, stiff, erect, slightly glaucous. *h.* 6in. to 12in. Europe, 1596. A well-known and pretty plant. (S. B. F. G. 15; B. M. 157, under name of *Hyacinthus botryoides.*) This species has two or three varieties, including *album*, with white, and *pallidum*, with pale blue flowers.

M. commutatum (changeable). *fl.* bluish at first, changing to reddish-purple, disposed in very short racemes; teeth of perianth inflexed. Spring. *l.* linear, flaccid, longer than the flower-stem. *h.* 6in. to 10in. Sicily, 1836. (S. B. F. G. ser. ii. 369.)

M. comosum (tufted). *fl.*, sterile ones blue, twenty to thirty, corymbose; fertile perianth obovoid-urceolate, amethystine-olive; racemes loose, forty to one-hundred flowered; scape 1ft. or more long, dusky-spotted. April. *l.* three or four, fleshy-herbaceous, pale green, linear-lorate, 1ft. to 1½ft. long, ½in. to 1in. broad. South Europe, 1596. See Fig. 609. (B. M. 133, under name of *Hyacinthus comosus.*)

Muscari—*continued.*

M. c. monstrosum (monstrous-tufted).* Feather Hyacinth. *fl.* bluish-violet, all barren, and the inflorescence transformed into a dense tuft of slender ramifications. Early summer. *l.* linear, toothed at the edges, longer than the flower-stem. *h.* 1ft. to 1½ft. South Europe, 1596. A very remarkable and distinct form, far too rarely seen in our gardens.

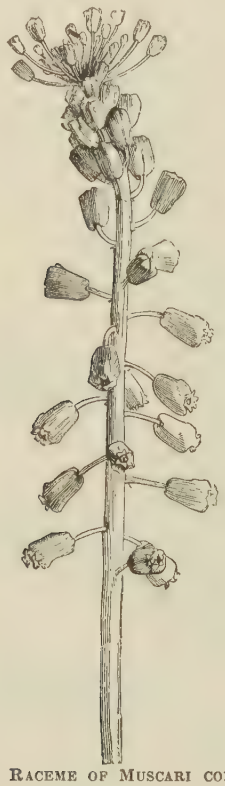


FIG. 609. RACEME OF MUSCARI COMOSUM.

M. concinnum (neat). *fl.* bright blue, tipped with white, strongly scented; raceme dense, over 1in. long; scape 3in. to 4in. long. Spring. *l.* linear-sub-terete, 6in. long, about ⅛in. broad. Native country uncertain.

M. conicum (conical). *fl.*, fertile ones bright violet-blue; sterile ones few, light blue; raceme dense, oblong-conical, 1in. long; scape slender, 6in. long. March. *l.* flaccid, six to a bulb, nearly 1ft. long. Campagna.

M. dilutum (diluted). *fl.*, perfect ones deep violet; sterile ones pale violet, crowded, sessile; raceme dense, 1½in. long; scape 4in. to 6in. long. Spring. *l.* several, linear, flaccid, 1ft. long, under ¼in. broad, red-purple at base. Native country unknown.

M. Elwesii (Elwes').* *fl.*, sterile ones bright blue, few; raceme dense, ½in. to ⅝in. long; scape slender, 3in. to 4in. long, reddish at base. April. *l.* several, flaccid, terete, 6in. long, half a line in diameter. Caria.

M. grandifolium (large-leaved). *fl.* livid blue; racemes densely fifteen to twenty-flowered; scape 5in. to 6in. long. *l.* five or six, fleshy-herbaceous, glaucescent, 1½ft. to 1½ft. long, ½in. broad, linear-lorate, flaccid. 1869. (Ref. B. 173.)

M. Heldreichii (Heldreich's).* *fl.* blue, very similar to those of *M. botryoides*, but nearly double the size, and arranged in a longer raceme. Spring. *l.* linear, flat. *h.* 8in. Greece, 1869. (Ref. B. 172.)

M. luteum (yellow). *fl.* large, very dull yellow at first, but changing to a clear, waxy, sulphur-colour, delightfully fragrant. Spring. *l.* channelled, 8in. to 10in. long. *h.* 6in. South Europe.

M. macrocarpum (large-fruited). A synonym of *M. moschatum flavum.*

M. micranthum (small-flowered). *fl.* fragrant; fertile ones bright violet; sterile ones pale blue, minute; racemes dense; scape slender, 4in. to 5in. long. April. *l.* 5in. to 6in. long, ⅛in. to ¼in. broad, flaccid, linear, sub-terete.

M. moschatum (musky).* Musk Hyacinth. *fl.* purplish at first, changing to a greenish-yellow tinged with violet, very fragrant, arranged in a dense, nearly globose cluster, about 2½in. long. Spring. *l.* alternate, linear, concave, about as long as the flower-stem. *h.* 8in. to 10in. Asia Minor, 1596. A pretty and exceedingly fragrant, but very inconspicuous species. (B. M. 734.)

Muscari—*continued.*

M. m. flavum (yellow). *fl.*, perianth yellowish; teeth purple; racemes loose, 2in. to 3in. long, 1in. or more thick. (B. M. 1565; S. B. F. G. 210, under name of *M. macrocarpum.*)

M. neglectum (neglected).* *fl.* deep blue, sweet-scented; raceme dense, thirty to forty-flowered, 1½in. to 2in. long, nearly 1in. wide; scape 6in. to 9in. long. *l.* linear, filiform, deeply channelled, fleshy. France, Italy, &c. (G. Aug. 16, 1884.)

M. pallens (pale). *fl.* white, abortive ones three or four, subsessile; raceme dense, twelve to twenty-flowered; scape 3in. to 5in. long. May. *l.* two, filiform, semi-terete, 6in. to 8in. long, one line broad, greenish. Crimea, 1822. (S. B. F. G. 259.)

M. paradoxum (paradox).* *fl.* blue-black, greenish inside, faintly scented; raceme dense, conical, 1½in. long; rachis lurid purple; scape green, 5in. to 6in. long. April. *l.* three, erect, terete, 8in. to 9in. long, ½in. to ⅝in. broad. Bulb large. Caucasus. A well-marked plant.

M. racemosum (racemose).* *fl.* dark blue, small, ultimately changing to a reddish-purple, and sometimes tipped with white, smelling strongly of Plums; racemes terminal, dense. Spring. *l.* linear, stiff, fleshy, 6in. to 12in. long. *h.* 4in. to 8in. Europe (Britain), Asia. (Sy. En. B. 1529; B. M. 122, under name of *Hyacinthus racemosus.*)

M. Szovitsianum (Szovits').* *fl.* faintly scented; fertile ones bright blue; sterile ones light blue; raceme dense, 1½in. long; scape 4in. to 5in. long. March and April. *l.* flaccid, linear-subterete, 5in. to 6in. long, ⅛in. to ¼in. broad. Bulb rather large. Persia, Caucasus, &c.

MUSEÆ. A tribe of *Scitamineæ.*

MUSHROOMS. The popular name given to a group of Fungi, very numerous in species, but with a strong family likeness, which renders them easily recognisable, as will be seen from the subjoined figures (Figs. 610 and 611). In a limited sense, the name is often used to denote certain edible Fungi; but, in a wider sense, it includes many useless and poisonous kinds, such as Toadstools, the Fly Agaric, and numerous others belonging to the genus *Agaricus*, as well as to certain allied genera, viz., *Boletus*, *Cortinarius*, *Hydnum*, *Lactarius*, &c.; and it is even used occasionally, but incorrectly, to denote all Fungi. Excluding this last sense, the Mushrooms, in their commonly-known condition, are only the spore-bearing parts of the plants, and arise from a dense network of filaments (mycelium) buried in soil containing decaying matter, or in the wood of dying or dead trees. These spore-bearers generally resemble a cap (pileus), supported on a stalk, which is fixed to the lower surface of the cap in the middle, or, less frequently, to one side of it. The cap may vary from ½in. to about 1ft. across, and the stalk also varies much in length and in thickness. On the lower surface of the cap is spread the hymenium, or surface on which the spores are formed. These are fixed to short, slender stalks, of which four stand on the free end of each of certain large cells (basidia), which are scattered over the hymenium. The latter varies much in the mode of attachment to the cap, and in the degree and modes of folding that it undergoes. The genera and species nearly related to the true Mushrooms have it easily separable from the tissue of the cap; but *Polyporus*, and certain allied forms have it closely grown to the latter. The surface over which the hymenium is spread, is very much increased, in most of the genera, by being folded in various ways.

In *Agaricus*, the genus to which the great majority of Mushrooms belong, the lower surface of the cap bears numerous thin plates (gills), hanging downwards, and radiating from the stalk to the circumference; and on the sides of these the spores are formed. The gills may be continued unbroken into the stem, or may be separated from it by a narrow space. This difference in the gills, the varied colours of the spores, and the presence or absence of the veil — a membrane passing, in the young Mushroom, from the edge of the cap to a ring round the stalk—are all important characters in determining the genus and species of Mushroom under examination. In *Hydnum*, the hymenium is scattered

Mushrooms—*continued.*

over fleshy, tapering outgrowths, or teeth, on the lower surface of the cap; in *Boletus* and *Polyporus*, the surface is formed by reticulately-joined ridges, that leave

FIG. 610. COMMON MUSHROOM (AGARICUS CAMPESTRIS).

tubes, or pores, between them; in *Craterellus*, it is smooth, or merely wrinkled. Mushrooms vary exceedingly in colour, the upper surface of the cap usually showing more decided tints than the stalk. Many are white; others yellow; others red in various tints; others show shades of grey or brown, at times almost passing into black. A smaller proportion are some shade of blue, or of metallic green; but they do not show a pure leaf-green, dependent on the presence of chlorophyll, since they never contain this substance. The surface of the cap is usually smooth; it may be sticky, hairy, warty, &c. Some species change colour, at once or gradually, if any part is broken. This is peculiarly noticeable in some kinds of *Boletus*, in which the bruised surfaces become an intense blue. The change to blue is to be regarded as a sign that the Mushrooms which show it are poisonous or suspicious in their properties. The smell of Mushrooms is slightly peculiar, and is usually not difficult to recognise, there being in it something that reminds one of a closed, mouldy vault or cellar. In decay, most of them emit a strong nitrous smell, some have a most disagreeably fœtid stench, but others are rather pleasantly scented, like newly dried hay. A curious property of some Fungi is the luminosity they display. In some kinds, the light is so strong that, in dark places, the plants can be seen from a considerable distance. This phenomenon is manifested by species in various groups of Fungi; but the most striking examples are met with in the genus *Agaricus*, several members of which have been observed to be luminous, apparently in the healthy state. In some, the cap and stalk emit light; but more frequently the mycelium in decaying wood is the luminous part. Another characteristic of some Mushrooms—*e.g.*, the genus *Lactarius* and several species of *Agaricus*—is the appearance, on broken or cut surfaces, of a milky fluid—the latex—which pours out from long tubular cells in the tissues of the plant. This

Mushrooms—*continued.*

fluid may be white, yellow, or orange; and, at times, changes colour after being exposed to the air for a short time. In some cases, the latex has a pleasant taste, while, in others, it is very acrid. Mushrooms, like Fungi in general, are propagated by means of spores, which, as already mentioned, are borne on large cells (basidia), produced on the hymenium. These spores can be obtained by laying the Mushrooms, gills downwards, on paper, which should be of a tint to contrast with them in colour. They will be found to map out on the paper the arrangements of gills or pores, and, in this way, their colour in mass also can be easily detected. The colour of the spores is largely employed in breaking up the very large genus *Agaricus* into sub-genera of more convenient size.

Uses. Mushrooms and their allies include almost all the Fungi that can be regarded as of direct use to man as food-plants. A considerable number have been, or are, used in diet, either because of the amount of nitrogenous matter in them, or as imparting a pleasant flavour to the articles with which they are served at table. But, while it is comparatively easy to recognise certain of the well-known edible Mushrooms, great care is required to prevent serious results when poisonous species are gathered by mistake, and eaten with the useful ones. Such a mistake is not infrequent, since a very great resemblance exists between certain poisonous and edible kinds. The Mushroom most generally esteemed in Britain is the Common Mushroom (*Agaricus campestris*, see Fig. 610). It is so well known as scarcely to call for a detailed description of its appearance. It is largely cultivated, but it is also frequently abundant in pastures, especially in natural grass land or meadows. At first, the gills are pale pink, or salmon-tinted, but they deepen into a peculiar purplish-brown. The upper surface of the cap varies somewhat in colour and smoothness, and there is a permanent ring of tissue around the stem, a

FIG. 611. ST. GEORGE'S MUSHROOM (AGARICUS GAMBOSUS).

little way below the cap. This Mushroom does not enjoy the same high reputation on the Continent of Europe that it possesses among ourselves; and, in Italy, it is said to

Mushrooms—*continued.*

be regarded by the labouring classes as even poisonous, or, at least, suspicious.

A nearly allied kind, the Meadow or Horse Mushroom (*A. arvensis*), is considerably larger than the last, and grows in similar localities; but its cap is pure white on the top while young, and it has paler gills than *A. campestris*. It is often gathered in large quantities for sale, but is somewhat less delicate than the Common Mushroom in its flavour. These are most abundant in autumn, but the St. George's Mushroom (*A. gambosus*, see Fig. 611), a large species, appears in spring. For this reason, and because of its flavour, it is much esteemed, and fetches a high price. The cap is nearly white, the gills are pale yellowish, and there is no ring on the stalk. It can be dried so as to retain its characteristic flavour. It smells strongly of new meal. Numerous other species of the genus *Agaricus* are recognised in Britain as edible. Several of these are more abundant in woods than in open places, despite the general rule that Fungi from such localities are more open to suspicion. From among these useful Agarics we may enumerate the following, which, for the most part, are less generally known than are the preceding; and which are somewhat dangerous to use, from their resemblance to certain kinds which are often to be found in similar localities: *A. fragrans* and *A. odorus*, both with a scent like aniseed; *A. maximus*, white, may reach 14in. in breadth of cap; *A. ostreatus* and *A. ulmarius*, found on Elm trunks, both with stalk attached to one side of the cap; and *A. prunulus*, a white Mushroom, with a smell like meal, found growing in woods. Berkeley, in his "Cryptogamic Botany," p. 367, says that at least a tenth of the species of *Agaricus* are esculent. Other Mushrooms belonging to genera nearly allied to *Agaricus* are scarcely, if at all, inferior to its species in their value as food-plants for man; nor would the generic differences between them and *Agaricus* strike anyone not a botanist as of much importance. The more valuable of these edible forms are *Marasmius oreades* (*see* **Marasmius**) and *Coprinus comatus*. The latter is esteemed while the gills are still whitish or reddish in colour, but it soon becomes soft, and deliquesces into an inky fluid; it is common in pastures and other open places. Several species of *Cortinarius* (a genus with rust-coloured spores and a web-like veil) are also edible. All of them inhabit woods. Among them may be noted *C. violaceus* and *C. cinnamomeus*, characterised by their colours, to which they owe their specific names. In the genus *Lactarius*, notable because of the milky juice that its species contain, several are dangerous and acrid; but others are esculent, their juice being mild and pleasant in flavour. The quality of *L. deliciosus* is sufficiently indicated by its name. This Mushroom is an exception to the rule that change of colour in broken parts is to be regarded as a sign of poisonous properties, since the milk in it, when fresh, is saffron-coloured, but, when exposed to the air, becomes dull green.

The genus *Russula* also includes both poisonous and edible species, but need not be dwelt on here, as the latter are not largely used.

Cantharellus cibarius, or the Chantarelle, is one of the best of edible Mushrooms. *See* **Chantarelle.** Very similar in appearance to the gill-bearing Fungi are many of those in which the gills are replaced by teeth, as in *Hydnum* (*see* **Hydnum**), or are united, so as to leave between them tubes or pores, as in *Boletus*, *Fistulina*, and *Polyporus*, and these are usually included among Mushrooms. *Boletus* includes numerous kinds, much like Agarics, but the lower surface of the cap shows very numerous pores. *B. edulis* (see Fig. 612) is sold in many parts of the Continent of Europe, cut into thin slices, or hung on strings and dried. It is little esteemed in England. *B. æstivalis*, which appears in early

Mushrooms—*continued.*

summer, is said to be of excellent flavour. Various other species of *Boletus* have been recommended as of fair quality, such as *B. aureus*, *B. aurantiacus*, &c.; while others, on the contrary, are dangerous.

Polyporus is a very large genus, the species almost all growing from dying or dead wood, and being attached to the stalk by one side. The spore-bearing surface is usually below. The species vary much in texture, between fleshy and woody. Several may be said to be edible, but cannot be highly recommended.

Fistulina hepatica, or the Beef-steak Fungus, like the last, grows on trees, usually Oak, and is much like *Polyporus* in structure, but is juicy. The popular name is derived from the great resemblance to a piece of beef-steak. Its weight may exceed 20lb. It is used sliced and eaten with salad, or like true Mushrooms, and is much esteemed as an article of diet. Catsup, or Ketchup, made from the juice of many kinds, is also a valuable product of the group.

FIG. 612. BOLETUS EDULIS.

INJURIOUS PROPERTIES OF MUSHROOMS. Some of the evils attending the use of these plants must be mentioned here. Among the more serious are the poisonous effects produced when many of them are used as food, these effects varying, according to the nature of the Fungus, from mere nausea to very serious symptoms, or even death. Many of the poisonous species are so similar to edible ones, that the only safe rule to follow is to make oneself thoroughly familiar with the latter, or, at least, with a few of them; and to use these alone rather than to risk the consequences of using poisonous kinds by mistake. Rules have frequently been given whereby poisonous and edible Mushrooms respectively may be recognised, such as that those should be avoided, or, at least, used with great caution, that grow on wood, or have a strong, disagreeable smell, or acrid taste, or turn blue when broken, or are bright red in colour, or have pink spores; but all such rules err by admitting hurtful, or excluding useful, kinds, and only familiarity with the individual species can be safely relied on as a guide as to what to use. But even edible Mushrooms may become injurious if kept too long before being eaten; hence, they should be used only when fresh, except in the case of the few, like *Marasmius oreades*, that can be dried and preserved for future use. Any suspicious kinds should be cooked for a long time with abundance of salt and vinegar, as the poisonous properties are fre-

Mushrooms—*continued.*

quently removed by this treatment. Among the most poisonous of the commoner Mushrooms is *Agaricus (Amanita) muscarius*, or the Fly Agaric, a large Mushroom, with a red cap, studded over with pale warts

FIG. 613. FLY AGARIC (AGARICUS MUSCARIUS).

(see Fig. 613), common in woods in Britain. This plant, if eaten, even in small amounts, causes headache, nausea, and delirium, and often convulsions, followed by stupor; and the urine of those who have eaten it, when swallowed, produces the same effects. It is occasionally used as a fly poison, whence its name. *Russula emetica*, with smooth red cap and white gills, also found in woods, is very poisonous, giving rise to vomiting and purging. Many others, more or less virulent, might be dwelt upon, did space allow. But, besides directly bad effects, many Mushrooms are scarcely less hurtful indirectly, by the evil they do to trees and other plants, unless, indeed, we suppose the fungi to follow, not to cause, disease. From this point of view, *Agaricus melleus* is probably the most hurtful of the true, or gill-bearing, Mushrooms. It grows usually in dead or dying wood, but it also attacks cut or bruised surfaces, and from these its mycelium extends to the healthy wood, and soon causes the latter to decay. Very frequently, the

Mushrooms—*continued.*

mycelium forms black root-like bodies, running between the wood and the bark of the tree, emitting short branches at right angles to the larger ones. It is peculiarly injurious to conifers, and seems to be almost cosmopolitan in temperate zones. Its evil properties may be regarded as slightly compensated by its being edible, though not highly esteemed because of its acrid, disagreeable taste. The stalk is yellowish, with a blackish tinge at the base, 3in. or 4in. long, at last becoming hollow, and near the top bearing a complete annulus. The cap is yellow-brown (or may show a greenish tinge), with the centre darker, and bears scattered brown scales. The gills are white or yellowish, and are broad but unequal. The cap has a peculiar earthy aspect. The pore-bearing Fungi are yet more hurtful than Agarics, and several species of *Polyporus* may be enumerated that are markedly injurious to trees. Observations upon their powers of doing harm have been made far more completely in Germany than in our native forests. Space will permit here of little more than an enumeration of some of the more generally distributed of the hurtful kinds, *e.g.*, *P. sulphureus*, on Oak, Willow, Larch, &c.; *P. dryadeus*, on Oak; *P. betulinus*, on Birch; *P. igniarius*, on Poplars, Willows, Ash, Cherry, &c.; and *P. vaporarius*, on conifers. The nearly allied *Trametes Pini* and *T. radiciperda* are very fatal at times to Pines on the Continent; and *Fistulina hepatica* causes the decay of Oak. Wood prepared or made use of for building houses or ships is also liable to injury unless thoroughly seasoned and kept in a dry place; and Dry-rot is but too familiar to many a householder, because of the rapid decay induced by the mycelium of Fungi, by which the wood is brought into a powdery, rotten state. The species that generally bring about this condition are **Merulius lacrymans** (which *see*), *Polyporus hybridus*, and *P. vaporarius*; but others also are known to be destructive.

Remedies. Upon the nature of the injuries done by Fungi, the remedies must, of course, depend. To avoid evil effects from the use of Mushrooms as food, great care must be exercised to insure that only edible kinds shall be gathered and made use of. Long exposure to heat in cooking, combined with the free use of salt and of vinegar, has been found to remove the poisonous properties of many species, but not of all. Should evil results follow the use of Mushrooms in food, the readiest means for the removal of the food by emetics and purgatives should be resorted to, and a doctor should be summoned without delay. It is hardly possible to prevent the death of trees attacked by such Fungi as *Agaricus melleus* or *Polyporus squamosus*, since the wood is full of their mycelium. Unless the trees are of very peculiar value, it is better to destroy them at once, in order to prevent the Fungus spreading to other trees. Prevention is far better than cure, and more regard must be paid to the preservation of those still sound than to keeping the diseased one. Young trees should never be planted in soil in which there are decaying pieces of wood. For the treatment of Dry-rot, *see* **Merulius lacrymans.**

A few words may be added upon the geographical distribution of Mushrooms. Many of them are known to be almost cosmopolitan, or to be distributed in countries very wide apart; while others are, as yet, known to occur only in very limited areas, probably because of the small number of workers in this group of plants leaving our information regarding them very incomplete. The genus *Agaricus* is more abundant, and its species are more fleshy, in temperate than in tropical latitudes. On the contrary, *Polypori* are more numerous and striking in tropical regions. In temperate climates, Mushrooms are most numerous in autumn; but, in tropical countries, they appear all the

Mushrooms—*continued.*

year round. In respect to habitat, Mushrooms may be met with in all situations where decaying or dying plants occur, or where the soil is full of organic matter. Hence, they are most abundant in forests, on the soil, and on dead or dying trees; and some species prefer woods composed of certain kinds of trees — thus, forests of Firs and other conifers are particularly rich in Mushrooms. *Agaricus* affords examples of preferences of all kinds, some even growing on dead plants of other species of this genus, others in open places, but most in woods. The sub-genera usually show a preference for some one kind of habitat, *e.g.*, *Amanita* and *Collybia* prefer woods; *Lepiota* and *Psalliota*, open places; *Omphalia*, swamps; and so forth. *Cantharellus* prefers grassy spots in woods; *Coprinus*, the neighbourhood of mankind; *Hygrophorus*, open places, such as meadows and moorlands, even high on the sides of mountains; *Hydnum*, the shade of woods; *Russula*, soil in open places in woods. *Polypori* are almost confined to woods, or to dead logs.

Mushrooms preserve badly as fossils; hence, comparatively little is known of them in this state, though a few, *e.g.*, *Polyporus lucidus*, have been found semi-fossilised in the later formations.

CULTIVATION. The cultivation of the common Mushroom (*Agaricus campestris*) is invariably work of great importance in gardens, a supply being generally expected from those wherein the means of cultivation are at command. Conditions requisite for securing good crops seem, in many instances, to be of an exact description, while, in others, excellent results are attained when only ordinary attention is bestowed in preparation. This may partly be attributable to the seasons, natural temperatures, and other matters being favourable or otherwise to Fungus growth. Gardeners experienced in Mushroom culture, know with tolerable certainty, how a bed is likely to succeed from the time it is made up and spawned; but there are many cultivators, noted, maybe, for their success in other departments, who, from one reason or another, frequently fail to secure satisfactory results from their efforts devoted to Mushroom culture. There are various causes to which failure may be attributed, if any of the numerous details in cultivation are improperly executed. Attention from the first in the preparation of manure, is one of the most essential points; then, its condition when made into a bed, respecting the temperature likely to be reached by fermentation; afterwards, and last, but not least—to omit a special reference to minor matters—the quality of the spawn. Mushrooms are far more extensively grown, for various reasons, in winter and spring, than they are in summer time, the produce being then in great demand, and no supply obtainable from the open air, as in the latter part of summer and in autumn. A cool temperature, also, is more suitable to their growth, in the later stages, at least, and this is only with difficulty obtained in summer, except by those fortunate enough to possess a house or cellar below the ground level for devoting to Mushroom culture. The spawn requires a somewhat high temperature at first to cause its diffusion to all parts of the bed, and then a much cooler one throughout the later stages of development into the Mushroom as it is used. This is well shown by the appearance of the crop naturally in greater abundance outside when the temperature of both the earth and air are on the decline, and the ground is well moistened by early autumn rains.

Preparation of Manure. Manure from stables in which carriage horses are kept, is usually procurable for Mushroom culture, and, as a rule, none could be better suited for the purpose. It should be collected each morning, if possible, and laid separate from the litter in a covered shed, with an open front. Here it must be

Mushrooms—*continued.*

frequently turned, to prevent overheating, and to allow of the escape of rank steam. When enough is accumulated to make a bed of the desired size, it should be kept separate from any that is freshly obtained, the latter being put into another heap, and, in turn, similarly treated. Each or every alternate morning, the heap first referred to must be turned and well shaken apart, until rank steam is no longer present, and the manure is just sufficiently moist to hold together when squeezed. The time thus taken in preparation varies considerably, according to the prevalence of a dry or moisture-laden atmosphere. Some cultivators of Mushrooms prefer a portion of litter mixed with the manure, while others do not. The chief difference is the effect it has when the beds are being made, in preventing the mass from being rammed too firmly. The degree of firmness often affects the period over which the crop is produced, by shortening or lengthening it in proportion. This will be further referred to; and as good results have been obtained both with and without litter intermixed, the matter is not one of material importance.

Formation of Beds, Spawning, &c. The manure, having been thoroughly prepared, as above described, should be made up at once into a bed, a suitable depth for this being 9in. in front and about 12in. at the back, if against a wall. The size in other directions must be regulated by the amount of manure available and other circumstances. When a supply of Mushrooms is required in the shortest possible time, the manure should be merely well trodden, to render it firm, but otherwise it should be rammed hard throughout with a brick or hand-rammer. It is not advisable to introduce the spawn at once, as its vitality may be destroyed if the bed should become over-heated. The highest temperature here recommended at which spawning may be practised with safety, is 90deg., and it should be known for certain that the heat is, at the time, gradually receding below that point. Small pieces of spawn should be inserted in holes made with a trowel, about 4in. apart, the manure so removed being used for covering it over. In about a week afterwards, or sometimes earlier, 1in. to 2in. of moist, rather heavy loam, free, if possible, from sand, which is very injurious, should be laid all over the surface, and beaten hard with the back of a spade. The tiny Mushrooms seldom appear in less than four or five weeks from spawning, and the time during which the beds remain productive afterwards varies very considerably. Mushrooms are often more in demand for various dishes when about half than when fully developed. In this stage,

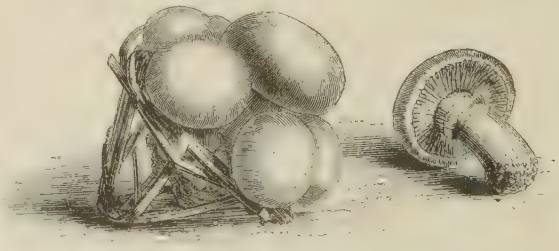


FIG. 614. MUSHROOMS (AGARICUS CAMPESTRIS), in the "Button" stage of development, and one older.

represented in Fig. 614, they are called "buttons," the single specimen shown being, however, that of an older one. No more should be cut when at this size than is really necessary, as it is obvious that the crop would be enlarged considerably by allowing a few days' more growth. A successional bed should be ready for spawning by the time the previous one begins bearing. Opinions differ respecting the watering of Mushroom beds. It is tolerably certain that watering frequently proves very injurious,

Mushrooms—*continued.*

and should be avoided as much as possible; yet it is difficult to keep the surface sufficiently moist when fire-heat becomes a necessity. Sometimes, when beds have become very dry, a good watering has caused a heavy crop to spring up; consequently, it is not always an injurious practice. The walls of the Mushroom house should be frequently syringed, and the floor always kept moist, especially when the use of fire-heat is necessary.

Outside Culture. Growers of Mushrooms on a large scale for market, pursue a different system altogether from that just described, by forming their beds in ridges outside. These ridges are made on a hard piece of ground, and are about 3ft. wide at the base, the two sides sloping some-

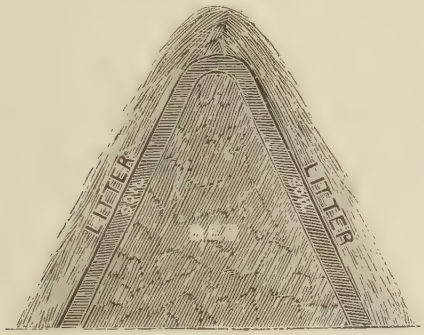


FIG. 615. RIDGE MUSHROOM BED.

what steeply to the top (see Fig. 615). The manure is collected from stables, and turned a few times, but it does not receive so much preparation as is recommended above for indoor beds. It is well trodden, and the sides are beaten hard into shape. After spawning, the whole surface is covered with about 2in. of adhesive loam, which is usually watered, and then beaten with the back of a spade. A covering of litter or long straw, varying in thickness according to the temperature of the bed, is kept over the whole, as shown in the illustration, to ward off storms, and preserve, as near as possible, a uniform temperature underneath. It is obvious that this system involves a considerable amount of labour not required with beds inside, in covering and uncovering for every purpose, yet it is practised most successfully and very extensively by growers for market. Another plan, which may be useful for growing Mushrooms in outside beds, and affording them protection

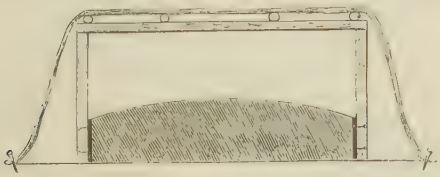


FIG. 616. PLAN FOR PROTECTING OUTSIDE MUSHROOM BEDS.

in winter, is shown in Fig. 616. Any sort of framework might be roughly constructed above the bed on

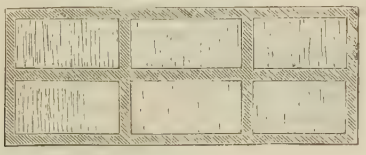


FIG. 617. STRAW SCREEN FOR COVERING MUSHROOM BEDS

which to place mats or other coverings, and a cord run over to fasten them on. Straw screens (see Fig. 617),

Mushrooms—*continued.*

or thatched hurdles, are excellent movable coverings, and, being non-conducting, they are well suited for preserving an equable temperature, where the admission of light is not necessary. A crop of Mushrooms is frequently found growing naturally outside in places where they are least expected, and such produce is considered superior to that obtained under artificial cultivation. The insertion of some spawn in an old melon bed, in the ordinary turf of a lawn, or in a small quantity of manure in any old cool frame, are also methods, at times, successfully practised with but little trouble in the summer and autumn.

Preparation of Spawn. What would be more correctly termed mycelium, is usually, in the case of the common Mushroom, called spawn. It is a dense, white, fibrous substance, found in quantity amongst old hotbeds, and in places where cattle are kept, these situations being most suitable for encouraging its growth. A dormant vitality is retained by this spawn for a very long time, if kept quite dry; consequently, the soil or manure containing it may be collected in a loose state, and scattered on beds artificially prepared, at any time. A plan which is, however, preferable to this, and the one most generally adopted, is the preparation of spawn in what are called bricks, from their resemblance in shape to flat bricks. These may be purchased from nurserymen, ready for use, at any season, about sixteen being considered equal to a bushel. Extensive cultivators sometimes prepare their own brick spawn; but only a very few, compared with the number who purchase it. One of the modes of preparation is briefly as follows: Fresh horse-droppings are collected and mixed with cow-dung, some using an equal proportion of each ingredient, and some a less quantity of the former, and a little adhesive loam is added to hold the other constituents together. The whole is mixed with liquid stable manure, until as soft as mortar, when it is spread on the floor of an open shed, until sufficiently dried to form into bricks of the shape and size desired. These should be set on edge, turned frequently, and allowed to get about half-dry. Then a hole, about 1in. square, should be made in one side of the brick, near the centre, and filled with good spawn, inclosing it with a little of a similar substance to that of which the bricks were made. Prepare a bed of fresh horse-dung, about 9in. thick, on a dry bottom; build the bricks in a pile above it, allowing a space between each two, and cover with litter, so as to retain a temperature underneath of, as near as possible, 60deg. Under such conditions, the spawn will spread itself throughout the whole of each brick, and the latter must be frequently examined and removed when they are permeated with a white cloudy substance, not so far advanced as to show minute threads. Good bricks of spawn should be in this condition when purchased; otherwise, any part which is too far advanced, or, on the other hand, not properly permeated with mycelium, will be useless. When removed from the hotbed, the drying process should be completed thoroughly, and the bricks stored in a cool, dry place, to arrest any further vegetation, until required for use. Other systems of preparing brick spawn are practised, differing mainly in details concerning the proportion of the different substances which it is advisable to use in the preparation and formation of the bricks.

Mushroom Houses. A Mushroom house may either be a span-roofed structure, or one with a lean-to roof against the back of a high wall. It should be situated as much as possible in the shade, in order that the internal temperatures may not be subjected to so much fluctuation, by reason of the sun shining on the roof. Hot-water pipes should be provided for maintaining the proper temperature in winter; but fire-heat is best done without as much as possible. The interior space may be fitted up for beds according to its size and shape, by having

Mushrooms—*continued.*

them on one or both sides against the walls, and a path down the centre; or, the beds placed above each other in the middle, and a path allowed all round, a plan sometimes adopted in span-roofed houses (see Fig. 618). In Fig. 619 a section of lean-to Mushroom house is represented, where

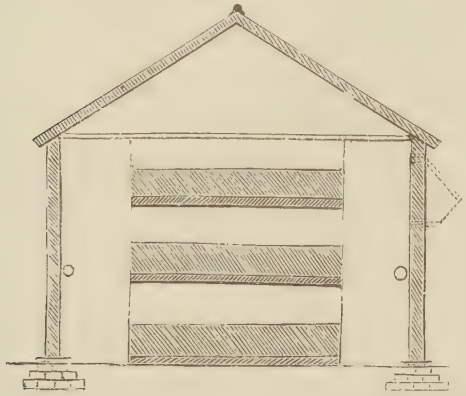


FIG. 618. SECTION OF SPAN-ROOFED MUSHROOM HOUSE.

provision is made for placing three beds one above the other. Two are usually enough in a house of any shape, unless it is very lofty, as a greater space is then available for making up and ramming each bed separately.

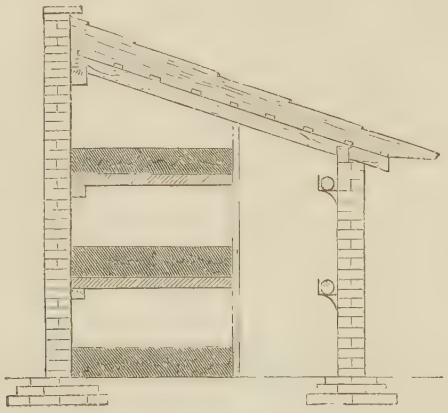


FIG. 619. SECTION OF LEAN-TO MUSHROOM HOUSE.

No light is necessary for the Mushrooms; but provision should be made for admitting it, to see how to work, and darkened shutters may be placed against the windows at other times. The temperature should be kept as near as possible at 50deg., to suit the beds that are bearing; the heat of other beds may be regulated by coverings of litter, or by movable shutters made to rest

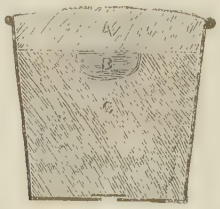


FIG. 620. MUSHROOM POT.

on fixed ledges 3in. above the surface, so as to inclose the bed and retain its heat. Mushrooms are sometimes

Mushrooms—*continued.*

successfully grown on a small scale in tubs or in large pots, as shown in Fig. 620, where A represents the loam on the surface, B the place for inserting some spawn, which would, however, be much better distributed in small pieces, and C the prepared manure. Good results are not unfrequently obtained by this method; but it is not worth practising where a more extensive plan can be adopted.

MUSK. *See* **Mimulus moschatus.**

MUSK BEETLE (*Aromia moschata*). This insect is of rather large size (1in. to 1¼in. long), and belongs to the group of *Longicornia*, or long-horned beetles. The antennæ are eleven-jointed, and, in the male, are longer than the body. The beetles are readily recognised by the smell of musk emitted by them (whence their popular name), and by their colour, which is shining metallic green on the body, passing into blue-black on the legs and antennæ. They can make a sound by rubbing the neck-shield on the meso-thorax. These insects, where common, as they are in various parts of the South of England, do great damage to Willows, by feeding, as larvæ, for several years in the stems of the older trees. The larvæ may grow to the size of over 1in. long, by ½in. broad. They are yellowish in colour, with darker plates and folds on certain parts, and are somewhat depressed in form, broadest just behind the small head, thence tapering gradually. The segments are well marked off from one another by constrictions. By means of powerful jaws, the larvæ are able to feed on the wood, and often cause the trees to decay. When full fed, they form cocoons in their galleries, and there change into pupæ. The beetles emerge in July and August, and may be found on Willow stems, or, in fine weather, flying around the trees.

Remedies. The beetles should be collected and destroyed. The larvæ may occasionally be exterminated by means of a sharp wire pushed into the holes; or by paraffin, or some other insecticide, injected from a syringe. Trees which are much infested should be destroyed.

MUSK MELON. *See* **Cucurbita moschata.**

MUSK ORCHIS. *See* **Herminium.**

MUSSÆNDA (a name applied by the Cingalese to some of the species). ORD. *Rubiaceæ*. This genus com-

FIG. 621. MUSSÆNDA MACROPHYLLA.

Mussænda—*continued.*

prises about forty species of mostly stove shrubs or sub-shrubs, rarely herbs, erect or twining, natives of tropical Africa, Asia, and the Pacific Islands. Flowers yellowish, rarely white, in many-flowered terminal corymbs; corolla funnel-shaped, with a five-parted limb and a villous throat. Fruit ovoid, fleshy, naked at the apex from the calyx being deciduous. Leaves ovate, petiolate, villous or glabrous. Several of the species are cultivated chiefly on account of the large coloured floral leaves or bracts, which are formed by the enlargement of one of the calyx segments. Mussændas are of easy culture in a compost of peat, loam, and leaf mould, in equal proportions, to which may be added a small quantity of silver sand. Propagated, during May or June, by cuttings, inserted in sandy soil, under a bell glass, in heat. The four undermentioned species are probably the only ones now in cultivation.

M. frondosa (leafy). *fl.* yellow; tube of corolla one-third longer than the calyx. May to September. *l.* stalked, oval-lanceolate, and, as well as branches, pubescent. *h.* 5ft. Tropical Asia, 1805. Erect shrub. (B. R. 517; B. M. 2099, under name of *M. pubescens.*)

M. luteola (yellow).* *fl.* bright yellow, with an orange centre, 1in. long, slender, the bract-formed calycine leaf ¾in. long, and pure white; corymbs terminal, trichotomous. Autumn and winter. *l.* almost sessile, ovate-lanceolate, acute, nerved, tomentose beneath. *h.* 5ft. to 6ft. Tropical Africa. A very pretty, erect, greenhouse shrub. (B. M. 5573.)

M. macrophylla (large-leaved). *fl.* orange, in terminal, trichotomous corymbs; large segment of calyx white. July and August. *l.* ovate, downy. Stem simple, ascending. *h.* 6ft. Tropical Asia, 1845. Shrub. See Fig. 621. (B. R. 1846, 24.)

M. pubescens (downy). A synonym of *M. frondosa.*

M. uniflora (one-flowered). *fl.* white, sweet-scented, solitary, with a long tube. *l.* opposite, cordate-ovate, sub-sessile. Stem slender. Cochin China, &c., 1883. A pretty, vigorous, and free-flowering herb, suitable for basket culture.

MUSSCHIA (named after J. H. Mussche, once Director of the Botanic Garden at Ghent, which he catalogued in 1810). ORD. *Campanulaceæ.* A genus comprising a couple of species of greenhouse, erect, perennial herbs or sub-shrubs, natives of the island of Madeira. Flowers large, in pyramidal panicles; corolla yellow or ochre-coloured; calyx lobes of a like colour, or livid purple. Radical leaves large, dentate; cauline ones smaller or few. Musschias thrive in well-drained fibry loam, and are propagated by seeds, sown in a gentle bottom heat.

M. aurea (golden).* *fl.* golden-yellow, erect, in loose panicles. Summer. *l.* crowded, glabrous, lanceolate, dentate. Stem short, stout. *h.* 1ft. to 2ft. 1777. SYN. *Campanula aurea.* (B. M. 6556.)

M. Wollastoni (Wollaston's). *fl.* yellow-green, large, 1½in. to 2in. long; calyx lobes oblong-lanceolate, acuminate; corolla tube cylindrical, shorter than the linear recurved lobes; stigmas radiating, ½in. long, revolute at apex; panicle erect, 2ft. high and upwards, with spreading branches. *l.* flaccid, 1ft. to 2ft. long, often purplish, oblong-lanceolate, tapering to a broad sessile base, doubly serrate, succulent towards the middle. *h.* 2ft. to 6ft. 1857. (B. M. 5606.)

MUSSEL SCALE. *See* **Apple Mussel Scale.**

MUSTARD (*Sinapis alba*). As a small salading at any time of the year, Mustard is largely cultivated for use along with Common Cress (*Lepidium sativum*). It is a hardy annual, a native of Britain, and may be raised in any quantity from seed, in the way recommended for Cress (*see* **Cress, Garden**). The seeds germinate quicker than those of Cress, consequently the latter should be sown about three days in advance, in order that the produce from both may be in the proper condition for cutting at the same time. The common White Mustard is the one in general use as a salad plant; but this, as well as the Black (*Sinapis nigra*), is extensively cultivated for its seed, which, after preparation, constitutes the table Mustard of commerce.

MUSTARD, HEDGE. *See* **Erysimum.**

MUTICOUS. Pointless.

MUTISIA (named after J. C. Mutis, 1732-1808, a South American botanist). ORD. *Compositæ.* A genus

Mutisia—*continued.*

of about thirty-six species of stove, greenhouse, or hardy, erect or climbing shrubs, natives of the Andes or extra-tropical South America, with a few Brazilian. Flower-heads purple, rose, or yellow, large, solitary, terminal, pedunculate; involucre usually cylindrical, with broad imbricated scales; receptacle naked; pappus of long feathery bristles. Leaves alternate, entire or pinnate, often terminating in a tendril. The stove and greenhouse species, which are not often seen in cultivation, thrive best in a rich, stiff, loamy soil; and may be propagated, in May, by cuttings of half-ripened shoots, placed in sand, under a bell glass, in gentle bottom heat. The hardy sorts do well grown against a sunny wall, in the open air, and in a moderately good soil; they are also increased, during spring, by cuttings, treated as above mentioned, but without bottom heat. The species best known to cultivation are described below.

M. arachnoidea (cobweb-like). *fl.-heads* red, solitary. July. *l.* pinnate; leaflets six or seven, ovate-lanceolate, very acute, sessile, cobwebbed beneath, terminated by a large branching tendril. Brazil, 1824. Stove climber. SYN. *M. speciosa.* (B. M. 2703.)

M. Clematis (Clematis). *fl.-heads* rich red, large. *l.* compound, with from seven to nine pairs of leaflets, ending in a branched tendril. Stems somewhat angular and slender, 20ft. to 30ft. in height. New Grenada, 1859. A distinct species, probably hardy in the Southern Counties of England. (B. H. 1864, 5.)

M. decurrens (decurrent).* *fl.-heads* deep orange, 4in. to 6in. across, on stalks 6in. to 12in. long; outer florets from twelve to twenty, rather long, narrow, reflexed. June to August. *l.* lanceolate, glaucous, with a tendril. Stems few, slender, twining. Chilian Andes. A handsome hardy perennial, thriving best when grown in partial shade, and against a wall. (B. M. 5273; F. d. S. 2408.)

M. ilicifolia (Holly-leaved). *fl.-heads* varying in colour from white to deep rose, rather small. Summer. *l.* dark green, Holly-like. Stems slender. South America, 1832. A very handsome stove or greenhouse climber. (B. M. 6009.)

M. latifolia (broad-leaved). *fl.-heads* pink and yellow. Autumn. *l.* cordate-oblong, dentate-spinose, woolly beneath, with a petiole. Stems with broad leafy wings. Valparaiso, 1832. A handsome and singular, hardy or half-hardy, evergreen, climbing shrub, thriving best in a dry soil, and against a wall. (S. B. F. G. ser. ii. 288.)

M. speciosa (showy). A synonym of *M. arachnoidea*

MYANTHUS (from *myia*, a fly, and *anthos*, a flower; in reference to its appearance when dried). Flywort. ORD. *Orchideæ.* A group of Orchids, distinguished by having two tendrils at the base of the column, instead of at its apex, as in *Catasetum* (with which genus it is now united). Plants have been found bearing flowers of the three supposed genera—viz., *Catasetum*, *Monachanthus*, and *Myanthus*—on one spike.

MYCELIUM. The name given to the vegetative part of fungi as contrasted with the reproductive organs. Fungi, except the lowest forms, are made up chiefly of long, slender threads, composed of rows of cells placed end to end; these threads usually branch, and are interwoven, so as to form a tissue that seems frequently composed of cells united in the way observed among other plants, though really only a false parenchyma. A good many kinds of fungi, supposed to be distinct, are really barren Mycelium only. Hence, with wider information, several of the genera have had to be included as mere forms of other groups. Mycelium is usually easily detected in the cells of parts attacked by a fungus. Occasionally, the presence of Mycelia alters the colour of the wood, *e.g.*, *Peziza æruginosa* so colours the wood that it becomes coppery-green. *See also* **Mushrooms.**

MYGINDA (named after Francis Von Mygind, 1710-1789, a German botanist). SYN. *Rhacoma.* ORD. *Celastrineæ.* A genus comprising about eight species of stove or hardy, glabrous or pilose shrubs, natives of tropical America (Brazil excepted) and Chili. Flowers small or minute, at the tips of the very short or elongated, sub-cymose peduncles, or sub-solitary, often in fours; calyx

Myginda—*continued.*

small; petals four or five, reflexed. Leaves opposite, alternate, or whorled (in one species distichous), variable in form, entire or crenated. *M. latifolia*, the species best known to gardeners, thrives in almost any moderately good light soil. Propagated in autumn, by cuttings of the ripened shoots, placed in sand, under a glass, in heat.

M. latifolia (broad-leaved). *fl.* white, small; peduncles trifid, few-flowered. April and May. *l.* elliptical, crenate, smooth, shortly stalked, coriaceous. *h.* 3ft. West Indies, 1795. Stove.

M. myrtifolia (Myrtle-leaved). A synonym of *Pachystima Myrsinites.*

MYLOCARYUM (from *myle*, a mill, and *karyon*, a nut; the dry seeds have four wings like a windmill). Buckwheat-tree. ORD. *Cyrilleæ.* A monotypic genus, the proper name of which is *Cliftonia.* The species is a half-hardy evergreen shrub, thriving in a compost of sandy loam and dried leaf mould; it requires a sheltered, warm border, but does best under cool greenhouse treatment. Propagated by cuttings of half-ripened shoots, inserted in sand, under a glass.

M. ligustrinum (Ligustrum-like). *fl.* white, fragrant; racemes spiked, terminal. May. *l.* cuneate-lanceolate, acute. *h.* 8ft. South United States. (B. M. 1625.) The proper name of this plant is now *Cliftonia ligustrina.*

MYOPORINEÆ. A natural order of erect or diffuse shrubs, rarely trees or sub-shrubs, natives, for the most part, of Australia, a few dispersed through the Southern islands from Mauritius as far as the Sandwich Islands, two in South Africa, two in the states of Japan or China, and one in the West Indies. Flowers axillary, solitary or fasciculate, sub-sessile or pedicellate. Leaves alternate, scattered, or rarely opposite, entire or rarely dentate, undivided, exstipulate. The order comprises five genera and about eighty species. Illustrative genera are: *Myoporum* and *Oftia.*

FIG. 622. FLOWERING BRANCHLET OF MYOPORUM PARVIFOLIUM.

MYOPORUM (from *myo*, to shut, and *poros*, a pore, or opening; referring to the transparent spots on the leaves). SYNS. *Andreusia, Pogonia* (of Andrews). ORD. *Myoporineæ.* This genus comprises about twenty species of erect, tall, or diffuse, greenhouse shrubs, rarely sub-shrubs, inhabiting Australia, New Zealand, the Mascarene Islands, the Malayan Archipelago, the islands of the Pacific, China, and Japan. Flowers often white, small or medium; corolla tube very short or cylindrical, sub-campanulate or funnel-shaped; pedicels axillary, often fasciculate. Leaves alternate or rarely opposite, entire or dentate. The species thrive in a compost of loam and peat, with a small quantity of sand added. Propagated by cuttings of the young shoots, taken during April, and inserted in sand, under a bell glass. The species are rarely seen in cultivation. All those described below are natives of Australia.

Myoporum—*continued.*

M. acuminatum (acuminate). *fl.* white; corolla almost campanulate, more or less bearded inside. March. *l.* alternate, varying from elliptic-oblong to lanceolate or linear. *h.* 3ft. 1812.

M. debile (weak). *fl.* pink or purplish. June. *l.* alternate, shortly petiolate or nearly sessile, elliptic, oblong, or lanceolate, entire or toothed. *h.* 1½ft. 1793.

M. parvifolium (small-leaved). *fl.* white, solitary, or two or three together. June. *l.* scattered, rather crowded, linear or linear-spathulate, sometimes under ½in. long. *h.* 3ft. 1803. See Fig. 622. (B. M. 1693.)

M. serratum (saw-toothed). *fl.* white and purple, several in each axil. May. *l.* generally elliptic-oblong or lanceolate, obtuse or acute, and more or less serrate, but in some maritime species nearly all entire. *h.* 2ft. The leaves and flowers of this species are very variable.

MYOSOTIDIUM (from *Myosotis*, and *eidos*, resembling; flowers like those of *Myosotis*). ORD. *Borragineæ.* A monotypic genus, the species being a very handsome hardy, or nearly hardy, herbaceous perennial, resembling a gigantic Forget-me-not. This plant is very difficult to cultivate; it is most impatient of root disturbance, and seems to do best in a cool, damp, sheltered spot outdoors.

M. nobile (noble). *fl.* white, with blue centres, about ½in. across, disposed in very large and dense racemes; corolla salver-shaped, with a very short tube. Spring. *l.* large, fleshy, glabrous, shining, plicate. *h.* 1½ft. Chatham Islands, 1858. (B. M. 5137.)

MYOSOTIS (the Greek name used by Dioscorides, and derived from *mys, myos*, a mouse, and *ous, otos*, an ear; supposed resemblance in leaves). Forget-me-not. ORD. *Borragineæ.* A rather large genus (more than forty

FIG. 623. MYOSOTIS ALPESTRIS, showing Habit, single detached Leaf, and Inflorescence.

species have been described by various authors) of very pretty and elegant hardy annuals or perennials, natives of North and South temperate regions, most common in Europe and Australia. Flowers blue, pink, or white, in terminal scorpioid cymes, bracteate or not. Radical leaves stalked, cauline ones sessile, linear-oblong. The species are of very easy culture in moist and shady places. All are propagated by seeds, sown in spring, on a warm sunny border. The perennials may also be increased by divisions of the roots, in spring; or by cuttings, placed under a hand light, in a shady spot, in summer.

Myosotis—*continued.*

M. alpestris (alpine).* *fl.* blue, with a very small yellowish eye, fragrant in the evening. Summer. *l.* lanceolate or oblong-linear, acutish, obsoletely three-nerved, strigose. Stems tufted, erect, beset with adpressed hairs, simple at bottom, but divided at top into short racemes. *h.* 2in. to 3in. Mountains of Europe (Britain). Perennial. According to some authorities, this is but a form of *M. sylvatica*, with larger flowers. SYN. *M. rupicola.* See Fig. 623. (Sy. En. B. 1106.)

M. azorica (Azorean).* *fl.* purple, eventually blue, without a yellow eye, about ½in. across, disposed in dense bractless racemes. Summer. *l.* hairy, upper ones oblong-obtuse, lower ones oblong-spathulate. *h.* 6in. to 10in. Azores, 1846. An elegant but somewhat tender perennial, with a habit similar to *M. alpestris*, but the flowers are larger, and the fruiting racemes lengthen considerably. (B. M. 4122.) There is a white-flowered form, *alba.* The garden form of this species known as IMPERATRICE ELIZABETH forms a branching bush about 6in. in height, and, when covered with its numerous heads of bluish-purple flowers, is a gem for pots or shady nooks in the rockery.

M. dissitiflora (distant-flowered).* *fl.* deep sky-blue, large, numerous. Very early spring. *l.* oblong-lanceolate, gradually pointed. *h.* 6in. to 12in. Switzerland, 1868. Perennial. A handsome species, closely allied to *M. sylvatica*, but differing in its shorter, more adpressed pubescence, brighter green leaves, and relatively longer pedicels, which curve upwards and inwards when in fruit. The most distinctive character, however, which separates *M. dissitiflora* and *M. sylvatica* resides in the nutlets (the so-called seeds), which are stalked in the former and stalkless in the latter.

FIG. 624. MYOSOTIS DISSITIFLORA ELEGANTISSIMA.

M. d. elegantissima (very elegant). A pretty variety, with white-edged leaves. See Fig. 624.

M. macrophylla. *See* **Anchusa myosotidiflora.**

M. obtusum. *See* **Anchusa Barrelieri.**

M. palustris (marsh).* True Forget-me-not. *fl.* blue, with a yellow throat; racemes simple or conjugate, bractless. Spring. *l.* oblong or spathulate, upper ones slightly decurrent, all bright glossy green. Stems creeping at the base, clothed with adpressed hairs. *h.* 6in. to 12in. Europe, &c. (Britain). A well-known and very lovely native perennial. (Sy. En. B. 1104.)

M. rupicola (rock-loving). A synonym of *M. alpestris.*

M. suaveolens (sweet-scented). *fl.* white or bluish, in simple or branched racemes, at first dense, at length several inches long; the pedicels short. *l.* oblong-linear or lanceolate, mostly acute, sessile, and broad at the base, or contracted into a short petiole, often decurrent; the lower ones sometimes 3in. to 4in. long, the upper ones small. Australia. An erect, but sometimes weak perennial.

M. sylvatica (wood).* *fl.* blue, with a yellow throat; racemes solitary and conjugate, very long, loose, bractless; pedicels much longer than the calyx. Spring. *l.* oblong-lanceolate, bluntish, clothed with soft hairs. Stems simple, divided at top into long loose racemes, hairy. *h.* 1ft. to 2ft. Europe, &c. (Britain). A handsome biennial or perennial species, of which there are numerous varieties. (Sy. En. B. 1107.)

M. virginica. *See* **Echinospermum virginicum.**

MYRCIA (a mythological name). ORD. *Myrtaceæ.* A very large genus (some 500 species have been described, but the number may probably be reduced to about 300) of stove trees or shrubs, all natives of tropical and sub-tropical America. Flowers often small; peduncles axillary, sub-terminal, many or rarely few-flowered; calyx limb segments and petals five, rarely four or three.

Myrcia—*continued.*

Leaves opposite, penniveined. The species are not much seen in cultivation; the under-mentioned is, perhaps, the best for horticultural purposes. It thrives in a compost of sandy peat and fibry loam. Propagated, in May, by cuttings of young shoots, rather firm at the base, inserted in sand, under a bell glass, in gentle bottom heat.

M. acris (sharp). A synonym of *Pimenta acris.*

M. amplexicaulis (stem-clasping). *fl.* white, fascicled on the branches, sessile, ⅜in. in diameter; panicles downy, from the upper axils, 6in. to 10in. long. *l.* opposite, sessile, 10in. to 16in. long, narrow-oblong or linear-oblong, acuminate, downy on both surfaces, reticulated above; lateral nerves below numerous, very divergent, elevated. Branches strict, erect, terete, stout; branchlets as thick as a goose-quill. *h.* 5ft. Rio de Janeïro, 1869. A very handsome shrub. (B. M. 5790.)

MYRIAPODA. An order of *Articulata*, or jointed animals, greatly resembling insects in being made up of horny rings (chitine), held together by soft membranes between them, as well as in breathing by air tubes (tracheæ) branching all through the body and opening on its surface by little mouths (spiracles), across each of which lies a structure like a sieve, that prevents the entrance of dust with the air. These animals also agree with insects in the general structure of the internal organs; in having a distinct head with one pair of antennæ or feelers, and simple eyes, usually in a group on each side, and legs made up of several distinct joints. They differ from insects in having no well-defined thorax, in the rings of the body being very numerous, and in their numerous pairs of legs, whence the popular names of Centipede and Millipede. The eggs are laid in the localities frequented by the animals, such as below stones, dead leaves, &c. The young ones, on emerging from the eggs, have only three pairs of true legs; but, at each change of skin during their growth, the number of the legs increases, as does also the number of simple eyes. Hence, till maturity is reached, the numbers of legs and eyes are too variable with age to permit of laying much stress upon them in determining species. *Myriapoda* usually feed upon insects, or upon plants; most frequently they feed on decaying parts of plants, but a few also attack living cultivated plants, and injure them considerably. They belong chiefly to two great groups, the Centipedes (*Chilopoda*) and the Millipedes (*Chilognatha*), and may be readily distinguished from one another by the following characters.

Centipedes have, for the most part, flattened depressed bodies, with only one pair of legs on each ring of the body. The lower surface of each ring is formed by a flat plate, which keeps the legs apart, so that they are seen projecting beyond the sides of the rings when the animals are crawling. The last pair of legs is longer and stronger than the others, and projects backwards. The front pair is modified to form two tapering, sharp-pointed, jaw-like organs, which can be made to pierce the skin of the animals that serve as food. Each of these organs is traversed by a tube that conveys poison from a gland near the head into the wound in the bodies of the prey, or those of assailants if being used in self-defence. Our native species are all of small size (½in. to 3in. long, and quite slender), but many tropical species are from 6in. to 12in. long, and give a very painful or even dangerous bite. Centipedes mostly feed on insects, or on others of the lower animals; hence, they are beneficial to gardeners. They are often met with in digging gardens. One kind (*Scolopendra electricus*, or *Geophilus longicornis*), sparingly met with in England, has the power of emitting a feeble light at times.

The Millipedes (*Chilognatha*) are easily recognised by their legs being more numerous than those of Centipedes,

Myriapoda—*continued.*

each of the rings behind the three that immediately follow the head seeming to bear two pairs. The legs are also inserted close to the middle line below, and are too short to project beyond the sides of the body when the animal is walking. The body is usually nearly cylindrical, less often depressed. This group possess no poison fangs. For further particulars regarding these animals and their relation to horticulture, *see* **Millipedes.**

MYRICA (from *Myrike*, the old Greek name, used by Homer, for the Tamarisk). Candleberry Myrtle. The only genus of Ord. *Myricaceæ* (which *see* for characters). Myricas thrive in moist and sandy peat. The greenhouse species are propagated by cuttings, taken during spring or autumn, and inserted under a hand glass, in a shady situation. The hardy ones may be increased by seeds, sown as soon as ripe; by layers, by cuttings, or by divisions.

Fig. 625. Flowering Branch of Myrica californica.

Fig 626. Flowering Branch of Myrica Gale.

M. californica (Californian). *fl.* greenish, monœcious. *fr.* purple, papillose, thinly coated with greyish-white wax. *l.* oblanceolate, thick, slightly tomentose below, 2in. to 4in. long, acute. A hardy evergreen shrub; in a wild state, it sometimes attains a height of 30ft. to 40ft. See Fig. 625.

M. cerifera (wax-bearing). Common Candleberry Myrtle. *fl.* reddish. May. *l.* lanceolate, pointed, serrated, flat, shining. *h.* 5ft. to 12ft. Canada, 1699. A small, hardy, evergreen shrub.

M. Gale (Gale). Sweet Gale. *fl.* brownish-green. February and March. *l.* lanceolate, serrated, tapering and entire at the base. *h.* 2ft. to 4ft. Europe (Britain), North Asia, and North America. A dwarf, fragrant, hardy, deciduous shrub. See Fig. 626. (Sy. En. B. 1243.)

M. Nagi (Nagi). *fl.* greenish. *fr.* edible, deep red-purple, oblong or globose, studded with mamillary tubercles, and with a juicy acid flesh of soft radiating fibres. *l.* cuneate-lanceolate, serrated above the middle. China and Japan, 1868. Greenhouse shrub or small tree. (B. M. 5727.)

M. quercifolia (Oak-leaved). *fl.* greenish. June. *l.* rigid, coriaceous, oblong, cuneate at the base, with sinuated margins. *h.* 3ft. Cape of Good Hope, 1752. Greenhouse evergreen shrub.

MYRICACEÆ. A natural order of trees or shrubs, often aromatic, widely dispersed over Europe, temperate and tropical Asia, South Africa, and North America, often abounding in dots and glands filled with aromatic secretions. Flowers unisexual; males in cylindrical sessile catkins; females in ovate sessile catkins, with closely imbricated bracts. Fruit a globose or ovoid drupe, often covered with waxy papillæ. Leaves evergreen or deciduous, alternate, penniveined, entire, serrate, irregularly dentate or lobed or regularly pinnatifid, with a single exception exstipulate. The bark of several *Myricaceæ* contains a resinous substance, which gives it astringent tonic properties; wax, benzoic acid, and tannin, are also yielded. The order contains but one genus—*Myrica*—and about thirty-five species.

MYRICARIA (a Latinised form of *Myrike*, the old Greek name, used by Homer, for the Tamarisk, to which the present genus is nearly allied). Ord. *Tamariscineæ*. A genus of about four species of hardy deciduous shrubs or sub-shrubs, natives of Europe and Central Asia. Flowers rose or white, in long, terminal, spike-like racemes; stamens ten, style absent, stigma capitate. Leaves small, Heath-like. Myricarias thrive in sandy spots, but hardly seem particular to soil. Propagated by seeds, sown in spring, in the open air; or from cuttings of firm young wood. The only species worth mentioning here is the following:

M. germanica (German). *fl.* white or rose-tinted, stalked, in spike-like racemes, attenuated above, lax below; petals lanceolate, acute. Summer. *l.* glaucescent, linear, obtuse, punctate. Stem woody, erect, much-branched; branches rigid, erect, slightly angular. *h.* 3ft. to 6ft. Europe, Asia, 1582. (B. F. F. 8.)

MYRIOPHYLLUM (the old Greek name used by Dioscorides, from *myrios*, myriad, and *phyllon*, a leaf; in reference to the numerous divisions of the leaves). Water Milfoil. Including *Pelonastes*. ORD. *Haloragæ*. A genus of about fifteen species of hardy, half-hardy, or greenhouse, floating, aquatic herbs (rising above the water to flower), found in all parts of the world. Flowers small, disposed in axillary whorls; upper ones male, lower ones female. Leaves finely cut, opposite or verticillate. Very few species are worth growing. They are propagated chiefly by divisions. Three species are represented in the British Flora, but they are not of any value from a horticultural standpoint.

M. proserpinacoides (Proserpinaca-like). *fl.* very minute, *l.* in whorls of five, very finely pectinated. Brazil, Chili, &c., 1879. A graceful half-hardy aquatic, with an extremely pretty feathery appearance. It requires mud to root in, and is easily increased. The stems are weak, but do not require support, all the pretty points of the shoots growing out of the water, perhaps to a height of 6in. or 8in. SYN. *Herpestes reflexa* (of gardens).

MYRIOPTERIS. Included under *Cheilanthes*.

MYRISTICA (from *myristikos*, smelling of myrrh, from *myron*, myrrh). Nutmeg. The only genus of ORD. *Myristicæ* (which *see* for characters, &c.). The undermentioned stove evergreen tree is the only species which calls for description here. It thrives in a sandy-loam and fibry-peat compost. Propagated by cuttings of ripened shoots, inserted in sand, under a bell glass, in bottom heat.

M. fragrans (fragrant). True Nutmeg. *fl.* pale yellow. June. *fr.* very much like a Peach, having a longitudinal groove on one side. *l.* alternate, entire, oblong, aromatic. *h.* 30ft. Indian Archipelago, 1795. "The Nutmeg consists of the albumen or perisperm, with the embryo at one end, and is covered by a thin membrane, which adheres closely to its surface, and projects into the substance of the albumen, thereby giving it the mottled appearance for which it is so remarkable" (Masters). SYN. *M. moschata*. (B. M. Pl. 218.)

M. moschata (musk). A synonym of *M. fragrans*.

MYRISTICEÆ. A natural order of trees and shrubs, having a styptic juice which reddens when in contact with the air, natives, for the most part, of tropical Asia and America, a few in Africa, and one each in Madagascar and Australia. Flowers white or yellow, dicœcious, usually axillary, in racemes, clusters, heads, or panicles, inconspicuous. Fruit succulent, one-celled, two (rarely four) valved; seed solitary, usually covered by a laciniate, often aromatic axil; albumen scented. Leaves alternate, nearly distichous, shortly petioled, coriaceous, simple, entire, penninerved, folded lengthwise when young, pubescent or scaly, exstipulate. *Myristicæ* furnishes the well-known Nutmeg and Mace of commerce. It contains but a single genus—*Myristica*—and about eighty species.

MYROBALAN PLUM. *See* **Prunus cerasifera.**

MYRODIA (from *myron*, myrrh, perfume, and *odme*, scent). SYN. *Lexarsa*. ORD. *Sterculiaceæ*. A genus comprising about seven species of stove evergreen shrubs or trees, with an aromatic odour, confined to tropical America. Petals white, oblong; peduncles opposite the leaves, short, one-flowered. Leaves entire or obsoletely toothed, penninerved, or irregularly three to five-nerved at base. Only one species has yet been introduced; it thrives in a rich sandy-loam soil. Propagated by cuttings of half-ripened shoots, placed in sand, under a glass, in heat.

M. turbinata (turbinate). *fl.* white, very fragrant; peduncles nearly as long as the petioles. May. *l.* elliptical, quite entire. Branches few. *h.* 8ft. 1793. Shrub.

MYROSPERMUM (from *myron*, myrrh, and *sperma*, a seed; in reference to the seeds yielding a strong-smelling resin). ORD. *Leguminosæ*. A monotypic genus, the species being a stove evergreen tree, native of tropical America. For culture, *see* **Myroxylon.**

M. frutescens (shrubby). *fl.* whitish-rose, disposed in terminal, simple or bifid racemes. May. *l.* alternate, pinnate, deciduous,

Myrospermum—*continued.*

with commonly three pairs of leaflets and an odd one, which are quite entire and smooth. *h.* 10ft.

MYROXYLON (from *myron*, myrrh, and *xylon*, wood; the wood is resinous and sweet-scented). Tolu Balsam-tree. SYN. *Toluifera*. ORD. *Leguminosæ*. This genus contains about six species of stove evergreen trees, natives of tropical America. Flowers in axillary or terminal clusters. Leaves impari-pinnate, marked with pellucid dots. The species thrive in a compost of loam and peat, to which may be added a small quantity of silver sand and leaf mould. Propagated, during summer, by cuttings of half-ripened shoots, placed in sand, under a bell glass, in bottom heat. The most important species are given below.

M. peruiferum (Peru Balsam-bearing). Peru Balsam-tree. *fl.* white, disposed in axillary racemes. *l.* coriaceous, abruptly pinnate, usually with about two pairs of ovate-lanceolate, entire, emarginate leaflets, which are full of transparent, linear, resinous dots. *h.* 40ft. Peru, &c., 1824. A very beautiful tree, long supposed (but erroneously) to be the source of Balsam of Peru.

M. pubescens (downy). *fl.* white, disposed in terminal racemes. August. *l.* rather membranous, ovate-lanceolate or oblong, smooth above and pubescent beneath, emarginate. Branches and petioles hairy. *h.* 40ft. South America, 1820. An elegant tree, the bark of which is filled with white resin.

M. Toluiferum (Tolu Balsam-bearing). Tolu Balsam-tree. *fl.* yellowish, disposed in small axillary racemes. *l.* oblong-ovate; leaflets oblong, acuminated, equal-sided, rounded at the base. Branches and leaves glabrous. *h.* 40ft. South America, 1733. A large, spreading tree, with very thick, rough, brown bark. The balsam flows from incisions made in the bark, during the hot season; its smell is extremely fragrant, somewhat resembling that of lemon, and its taste is warm and rather sweet. (B. M. Pl. 84, under name of *Toluifera Balsamum*.)

MYRRHIS (the old Greek name used by Dioscorides, probably from *myrrha*, myrrh; in allusion to the scent of the plants). Sweet Cicely or Myrrh. ORD. *Umbelliferæ*. A genus comprising only a couple of species of hairy, hardy, perennial herbs, with the habit of *Chærophyllum*; one is an inhabitant of the mountains of Europe and the Caucasus region, and the other is North American. Flowers white, polygamous; petals cuneate, obovate, or oblong; umbels compound; involucres one, two, or many-bracteate. Leaves pinnately-decompound; segments pinnatifid or toothed. The only species worth notice is the native *M. odorata*. This is a very graceful-looking plant, and is suitable for naturalising in many situations, such as in wild gardens and semi-wild spots generally. It thrives in almost any soil, and may be propagated by divisions or by seeds.

M. odorata (sweet-scented).* *fl.* white, in terminal compound umbels; involucels of many lanceolate ciliated leaves. May. *fr.* nearly 1in. long, with five very prominent ribs, usually clothed with minute stiff hairs. *l.* ternately decompound; leaflets pinnatifid. *h.* 2ft. to 3ft. Britain, France, eastward to Caucasus. Once cultivated as a pot-herb, and still used in salads in Italy. (Sy. En. B. 626.)

MYRSINE (the old Greek name given by Dioscorides to the Myrtle). SYNS. *Athruphyllum*, *Caballeria*, *Manglilla*, *Rapanea*, *Samara*, and *Scleroxylon*. ORD. *Myrsineæ*. This genus contains about eighty species of stove or greenhouse, glabrous trees or shrubs, rarely pubescent or tomentose, natives, for the most part, of Asia, Africa, or tropical America; a few are indigenous in Japan, extra-tropical Africa, Australia, the islands of the Atlantic, and New Zealand. Flowers small, disposed in axillary fascicles, sessile or pedunculate. Leaves coriaceous, entire, rarely serrulate. The species best known to cultivation are described below. For culture, *see* **Ardisia.**

M. africana (African). *fl.* pale, axillary, by threes; petals ciliated. March to May. *l.* elliptic, serrated, acute, dotted. *h.* 3ft. to 6ft. Cape of Good Hope, 1691. Greenhouse shrub.

M. capitellata (small-headed). *fl.* pale yellowish-green, small, in axillary, sessile, crowded heads. January. *l.* 5in. to 6in. long, oblong-lanceolate, rather acute, coriaceous, shortly petioled, quite entire, dark green above, paler beneath. *h.* 4ft. (in its native country a tree 30ft. to 40ft.). Nepaul, 1828. Stove shrub. (B. M. 3222.)

MYRSINEÆ. An order of trees, shrubs, or sub-shrubs, of variable habit, principally inhabiting the tropical parts of Asia and America; they are rare beyond the tropics, at the Cape of Good Hope, in Australia, New Zealand, Japan, and the Canaries. Flowers white or pink, rarely yellow, purplish, or golden, usually small; inflorescence cymose, umbellate, fasciculate, racemose, or paniculate. Leaves alternate or scattered, very rarely opposite, sometimes sub-verticillate, entire, dentate or rarely serrate, and, for the most part, gland-dotted. The order contains about twenty-three genera and 500 species. Illustrative genera are: *Ægiceras*, *Jacquinea*, *Myrsine*, and *Theophrasta*.

MYRSIPHYLLUM (from *Myrsine*, Myrtle, and *phyllon*, a leaf; leaves aromatic). ORD. *Liliaceæ*. A small genus of greenhouse, deciduous twiners, natives of the Cape of Good Hope, now included, by Bentham and Hooker, under *Asparagus*. Flowers greenish, on nodding pedicels, two or three together at the base of the leaves, from the axils of small white scales; perianth persistent, bell-shaped. Leaves ovate-lanceolate or lanceolate, obliquely cordate at the base. The species most generally grown is *M. asparagoides*, which thrives best if planted in a warm part of the greenhouse, and in a

FIG. 627. MYRSIPHYLLUM ASPARAGOIDES, showing (1) Portion of Flowering Stem, &c., reduced; (2) ditto, natural size; and (3) detached Flower.

prepared bed of loam and leaf soil, where the slender growths can be trained up a pillar or rafter. Plenty of water should be given when the plants are growing. Propagation may be easily effected by seeds, by cuttings, or by divisions of the root.

M. asparagoides (Asparagus-like).* *fl.* greenish or white. June. *l.* small, bright glossy green. Branchlets very pretty, spray-like; these are largely employed in the composition of wreaths, bouquets, &c. 1702. SYN. *Medeola asparagoides*. See Fig. 627. (B. M. 5584.)

MYRTACEÆ. A large order of trees, shrubs, or very rarely sub-shrubs, scarcely ever sub-scandent, inhabiting, for the most part, the tropical regions of the globe. Inflorescence axillary, simple, racemose or racemose-paniculate, rarely cymose. Leaves simple, entire, or rarely obscurely crenate-serrate, opposite or alternate, often dotted from pellucid glands sunk into the parenchyma, narrowed into a petiole at the base (or sessile); stipules usually none, or rarely geminate at the base of the petioles, minute, caducous. The order comprises about seventy-six genera and 1800 species. Illustrative genera are: *Darwinia*, *Hypocalymma*, *Leptospermum*, *Melaleuca*, and *Myrtus*.

MYRTLE. *See* **Myrtus communis.**

MYRTUS (from *Myrtos*, the old Greek name). Myrtle. Including *Luma* and *Ugni*. ORD. *Myrtaceæ*. An extensive genus (upwards of 100 species have been enumerated, but the number may probably be reduced) of stove, greenhouse, or nearly hardy, glabrous, tomentose, or pubescent, shrubs, rarely trees; they are mostly dispersed through tropical, extra-tropical, and Western South, America; eight are found in Australia, six in New Caledonia, four in New Zealand, and one frequently occurs in Europe and Western Asia. Calyx-tube turbinate; lobes and petals four or five, the latter spreading; peduncles axillary, often slender, one to many-flowered; central flowers short, lateral ones on long pedicels. Berry adnate to, or included in, the calyx-tube. Leaves opposite, penniveined. The common species (*M. communis*) and its varieties are popular and well-known plants, with flowers and foliage rather strongly scented. When grown in pots, they are equally well adapted for greenhouse, room, or window decoration. The small branches, especially of the narrow-leaved form, are very useful for intermixing with cut flowers. This species may also be grown against a wall, outside, in many parts, if a slight protection is afforded in winter. *M. Ugni* succeeds well, either planted out, or grown in large pots, in a greenhouse. The fruits, when ripe, are highly flavoured, and emit an agreeable perfume, which pervades the whole house. All Myrtles are of easy culture, in a compost of sandy loam and leaf soil. They are readily propagated by cuttings of firm or partially-ripened shoots, inserted under a glass, or in a close frame, those of the stove species requiring, of course, a warmer temperature than the greenhouse or half-hardy ones. The common species may be trained as tall standards, or in almost any shape desired. An abundance of water, and frequent syringings, are requisite for all Myrtles throughout the summer. The roots should not be allowed to get quite dry at any time.

M. bullata (blistered).* *fl.*, petals pale pink, orbicular peduncles one-flowered. Berry black, urceolate. *l.* shortly petioled, 1in. to 2in. long, broadly elliptic-ovate or orbicular-ovate, obtuse, acute, or apiculate. *h.* 10ft. to 15ft. New Zealand, 1853. Greenhouse shrub. (B. M. 4809.)

M. Cheken (Cheken). *fl.* white, numerous, axillary. *l.* small, closely set, oblong-ovate, obtuse. *h.* 6ft. Chili, 1847. A much-branched and densely-leafy, half-hardy shrub. (B. M. 5644.)

FIG. 628. FLOWERING BRANCHLET OF MYRTUS COMMUNIS.

M. communis (common).* Common Myrtle. *fl.* white; pedicels solitary, one-flowered, about the length of the leaves, bearing two linear bracteoles under the flowers. July. *l.* ovate or lanceolate, acute. *h.* 3ft. to 10ft. South Europe, 1597.

Myrtus—*continued.*

There are a number of varieties of this handsome, strongly scented shrub in cultivation, differing chiefly in the shapes of the leaves; there is also a variegated-leaved form. The typical species proves quite hardy in the South of England. See Fig. 628.

M. fragrans (fragrant). *fl.* white; peduncles nearly as long as the leaves, puberulous. April. *l.* leathery, oval-roundish or obovate, emarginate at top, shining above, black-dotted beneath. *h.* 8ft. Jamaica, 1790. Stove shrub. (B. M. 1242.)

M. Luma (Luma).* *fl.* white, large, on three to five-flowered branched pedicels; petals larger and more concave than in the common Myrtle. Summer. *l.* copious, opposite, nearly sessile, ¾in. long, broad-oval, nearly orbicular, but acute at base, and sharply apiculate at point. *h.* 3ft. and upwards. Chili. Greenhouse shrub. SYNS. *Eugenia apiculata* and *E. Luma.* (B. M. 5040.)

Myrtus—*continued.*

M. orbiculata (orbicular-leaved). A synonym of *Eugenia orbiculata.*

M. tomentosa (tomentose). *fl.* rose; peduncles one to three-flowered, bearing two ovate bracteoles under each flower, shorter than the leaves, velvety. June. *l.* ovate, velvety above in the young state, clothed with hoary tomentum beneath. *h.* 2ft. to 6ft. China, 1776. Greenhouse shrub. (B. M. 250.)

FIG. 629. FRUITING BRANCH OF MYRTUS UGNI.

M. Ugni (Ugni).* *fl.* white; pedicels axillary, one-flowered; calyx lobes reflexed. May. *fr.* globular (crowned with the persistent calyx teeth), red or black, glossy, with an agreeable aroma and pleasant taste; it is much esteemed in Chili. *l.* ovate, acute, glabrous; margins reflexed, dark green above, paler beneath. *h.* 4ft. Valdivia, 1845. Greenhouse shrub (hardy in South-west Britain). See Fig. 629. SYN. *Eugenia Ugni* (under which name it is figured in B. M. 4626).

NABALUS. Included under **Prenanthes** (which *see*).

NACIBEA. A synonym of **Manettia** (which *see*).

NÆGELIA (named after Karl Nægeli, an eminent German botanist, Professor of Botany at Munich). ORD. *Gesneraceæ*. A genus comprising six species of stove herbaceous perennials, with catkin-like scaly stolons, inhabitants of Mexico and Central America. Flowers red, whitish-yellow, or painted, in terminal, leafless, alternate racemes; corolla tube declinate; throat broadly oblique; limb broadly lobed, spreading, rotundate. Leaves opposite, soft, often cordate, on long stalks. Nægelias are exceedingly ornamental plants, both on account of their floriferous habit, and also because of their beautifully marked foliage. This latter should be carefully preserved from drip, and the use of dirty water avoided for syringing purposes; otherwise, a sediment collects amongst the tiny hairs on the surface of the leaves, and renders the whole plant unsightly. The stolons or roots, as they are generally termed, should be potted up in spring or summer, according to the time of year at which the plants are required to flower. A light compost of peat, leaf soil, and a small quantity of loam, is most suitable; it should only be pressed moderately firm in potting. Pots 5in. to 6in. in diameter, are large enough, about three roots being placed in the latter, or only one in the former size, covering them with 1in. of soil. If potting is deferred until after midsummer, the flowering season is often prolonged throughout the winter, especially with *N. cinnabarina*, a late-flowering and beautiful species. When the foliage dies away, the pots, with their contents, should be stored and kept quite dry, until the season for starting arrives again. Nægelias are readily propagated by the increase of stolons; also by cuttings made of the young stems or matured leaves, and inserted in a close propagating frame. *See also* **Gesnera** (under which genus the present one is often included).

N. amabilis (lovely). A synonym of *N. multiflora*.

N. cinnabarina (cinnabar-red). *fl.* scarlet, with a light throat. *l.* cordate, or broadly ovate, green, beautifully shaded with flame-coloured hairs. *h.* 2ft. Mexico, 1856. A very handsome winter-flowering plant. SYN. *Gesnera cinnabarina*. (B. M. 5036.)

N. fulgida (shining). *fl.* vermilion; panicles erect. *l.* broadly ovate, deeply and coarsely toothed at the edges, hairy, of a rich dark green. Veru Cruz, 1864. (R. G. 538.)

N. f. bicolor (two-coloured). *fl.*, upper portion of corolla vermilion, lower barred with white. Garden variety. (F. d. S. 1755.)

N. Geroltiana (Von Gerolt's). *fl.* like those of *N. zebrina*. Nearly throughout the year. *l.* cordate, sub-rotund-acute, coarsely dentate, softly pubescent, dark green. *h.* 1½ft. to 2ft. Mexico, 1844. (F. d. S. ii. April, 4, under name of *Gesnera Geroltiana*.)

N. multiflora (many-flowered). *fl.* white or cream-colour, shorter than the pedicels, drooping; raceme terminal, elongated; corolla with the tube scarcely ventricose, elongated, curved upwards below the very oblique, rather large, spreading, five-lobed limb; calyx almost hispid, with glandular hairs. Autumn. *l.* on long petioles, cordate, crenate. Eastern Cordillera of Oaxaca. (B. M. 5083; F. d. S. 1192, under name of *N. amabilis*.

N. zebrina (zebra-marked). *fl.* bright orange-scarlet, disposed in a long panicle. September. *l.* handsome, dark-marbled. *h.* 2ft. Brazil, 1840. A fine species. SYN. *Gesnera zebrina*. (B. M. 3940; B. R. 1842, 16.)

NAIADACEÆ. An order of marine or fresh-water, annual or perennial herbs, widely distributed over the globe. Flowers hermaphrodite, monœcious or dicœcious, small, often inconspicuous, spicate, racemose, or disposed on pedunculate, terminal, or axillary spadices, bracteate or ebracteate. Leaves submersed, emerging, or floating, in scape-bearing genera radical, linear, or rush-like; stem leaves opposite, alternate, or very rarely ternately whorled, sessile or petiolate, oblong, linear, or capillary, sheathed at base. The order comprises sixteen genera, and about 120 species. Examples: *Aponogeton*, *Naias*, and *Triglochin*.

NAILS. Nails are required in quantity for training fruit-trees and various other plants on garden walls, and are made of cast iron specially for the purpose. Any of another description would bend rather than enter a hard substance, such as that of a brick, while the cast-iron ones may invariably be driven in a horizontal direction far enough to retain a hold. They are said to be much preserved from rust by heating almost to redness before using, and throwing them into linseed oil. Wall Nails are made in different lengths, and as they are usually sold by weight, the smaller sizes represent a much greater number in any given weight than the larger ones. Nail bags are very handy for holding a stock of shreds, &c., whilst nailing up trees or plants from a ladder. They are best made from leather in the shape of an open pocket, and held in position by a narrow belt and a shoulder strap. One or more upright sheaths or divisions are frequently made inside, in which the workman's knife and hammer may be placed when either are not in use. Canvas bags answer the purpose equally well when leather ones are not procurable.

NAMA (from *nama*, a stream of water; alluding to the natural place of growth). ORD. *Hydrophyllaceæ*. A genus comprising fifteen species of low, annual, perennial, or at length suffruticose, herbs, of which one is a native of the Sandwich Isles, and the rest are found in North-west America and Mexico, one of them extending in South America as far as Brazil. Flowers often blue, small or mediocre, solitary in the axils, sessile or shortly pedicellate, or irregularly cymose at the apices of the branches. Leaves alternate, petiolate, sessile or decurrent, entire. The species are not much grown. They thrive in sandy loam or in any ordinary good garden soil, and require a sheltered situation in summer, and protection throughout the winter. Propagation may be effected by divisions, or by cuttings, made in spring, and inserted in a close, warm frame or propagating house. *N. Parryi* is the best known member of the genus.

N. Parryi (Parry's). *fl.* lilac-purple, arranged in unilateral, dense, scorpioid clusters, on a terminal branched panicle; corolla about 1in. long. *l.* linear, repandly-toothed, villous, hirsute. Stems woody at base. *h.* 4ft. to 5ft. California, 1881. Half-hardy herbaceous perennial.

NANDINA (from Nandin, the vernacular name of the shrub in Japan). ORD. *Berberideæ*. A monotypic genus. The species is an erect, half-hardy or greenhouse, evergreen shrub, thriving in loam and sandy peat. It may be propagated by cuttings of ripened shoots, inserted in sand, under a handlight. Probably this plant would prove hardy in a sheltered place in the more southern counties.

N. domestica (domestic). *fl.* white, with yellow anthers, terminal, panicled. July. Berries about the size of peas. *l.* decompound; leaflets entire; petioles sheathing at the base. *h.* 5ft. China and Japan, 1804. This elegant plant varies a good deal in the size of the leaflets. (B. M. 1109.)

NANDIRHOBEÆ. Synonymous with *Cucurbitaceæ*.

NANNORHOPS (from *nannos*, dwarf, and *rhops*, a bush; in reference to the low growth of the plant). ORD. *Palmeæ*. A monotypic genus, the species being a low, gregarious, unarmed, stove Palm, with a tufted, creeping caudex. It thrives in a compost of sandy loam, to which some leaf soil and a little charcoal may be added with advantage. Efficient drainage is an important essential. Propagated by seeds; also by offsets, when any can be procured and detached without injury to the parent plant.

N. Ritchieana (Ritchie's). *fl.* inclosed while in bud in the sheathing bracts; inflorescence erect, a slender compound panicle. *fr.* sub-globose or oblong, varying in size from ¼in. to ½in. in diameter. *l.* coriaceous, greyish-green; segments eight to fifteen, linear, rigid, 1ft. to 1½ft. long, induplicate, deeply bipartite. *h.* 3ft. to 20ft. India, &c. The leaves, &c., of this plant are used in the manufacture of fans, sandals, baskets, brushes, &c.

NANODES (from *nanodes*, a pigmy; in reference to the small size of the plants). ORD. *Orchideæ*. A genus of cool Orchids (now included, by Bentham and Hooker, under *Epidendrum*), distinguished in having the lip adnate to the column, and cohering with the lateral sepals, above which it is placed, and in the four compressed pollen-masses being sessile, side by side, on an ovate gland. They are natives of mountainous regions in South America. The species mentioned below thrive best in baskets of peat, fibre, and sphagnum, suspended near the glass.

N. discolor (discoloured). *fl.* purple, solitary, sessile, terminal, obscure, immersed between the leaves; sepals ascendent; petals declinate; lip fleshy, ovate, minutely crenulate. August. *l.* ovate-oblong, emarginate, amplexicaul, and sheathing at base, greenish-purple. Stems aggregate, 2in. to 3in. high, simple, densely leafy. Rio Janeiro. (B. R. 1541.)

N. Medusæ (Medusa's).* *fl.*, sepals and petals greenish, shaded with brown, large, terminal, produced two or more together; lip large and spreading, deeply fringed around the margin, rich maroon, with a green base. *l.* distichous, of a glaucous tint, curiously twisted, about 3in. long. Pseudo-bulb thick and fleshy, about 1ft. long. Andes. A rare and very curious plant. "Altogether, the flattened, stout culms, the pale glaucous colour of the foliage, and the extraordinary appearance and lurid purple of the flower, give it a most sinister appearance, and, for an Orchid, a most unusual one" (Hooker). (B. M. 5723.)

NAPIFORM. Formed liked a turnip; having the figure of a depressed sphere.

NAPOLEONA (named after Napoleon Buonaparte). SYN. *Belvisia*. ORD. *Myrtaceæ*. A small genus (only two species) of glabrous stove trees, restricted to tropical Africa. Flowers various-coloured, solitary, in the axils of the leaves. Leaves alternate, entire, or obscurely sinuate-toothed, dotted. *N. imperialis* thrives in a compost of sandy peat and fibry loam. Propagated by cuttings of half-ripened shoots, 2in. to 4in. long, inserted in sand, under a hand glass, in mild bottom heat. The second species is probably not in cultivation. The species described below was discovered, towards the close of the eighteenth century, by Baron Palisot de Beauvois, and the badly-executed figure given by that author in his "Flore d'Oware et de Bénin," coupled with the singular structure and colour, caused some botanists for a considerable time to doubt the very existence of the plant. All uncertainty was, however, cleared away in 1843, when Whitfield, a botanical collector, brought with him to this country, from Sierra Leone, dried specimens and living plants of *Napoleona*; one of the latter flowering, some years later, in the garden of the then Duke of Northumberland.

N. imperialis (imperial). *fl.* apricot-colour and crimson, assuming a bluish tint when they decay; exterior of corolla large, concave-sub-hemispherical, many-folded and toothed; intermediate corona deeply cleft as far as the base into filiform, spreading laciniæ; central portion erect, cyathiform, with a much-cut, inflexed margin. May. *l.* shortly stalked, ovate-acuminate, dark green. *h.* 6ft. 1844. (B. M. 4387.)

NARAVELIA (from *Naravael*, the Cingalese name of the genus). ORD. *Ranunculaceæ*. A genus comprising only two (or perhaps three) species of stove climbing plants, with woody stems, natives of Southern Asia or the Indian Archipelago. Flowers paniculate; sepals four or five, petaloid, valvate; petals numerous, linear or clavate. Leaves opposite, bifoliolate; petioles produced into tendrils. *N. zeylanica*, probably the only species yet introduced, is an ornamental plant, with the habit of *Clematis*; it thrives in a compost of sandy peat and fibry loam. Propagated by cuttings of half-ripened shoots, inserted in sand, under a hand glass, in heat.

N. zeylanica (Cingalese). *fl.* yellow, with four or five sepals and six to twelve linear petals; panicle terminal, with trichotomous pedicels. *l.* opposite, stalked; leaflets two, ovate-acuminated, on very short stalks, five to seven-nerved, quite entire, or notched with one or two teeth on each side, velvety underneath, smooth above, drawn out at the apex into a trifid, twisted tendril. Ceylon, 1796.

NARCISSUS (the old Greek name used by Hippocrates, connected with a mythological story). Including

Narcissus—*continued.*

Ajax, *Corbularia*, *Ganymedes*, and *Jonquilla*. ORD. *Amaryllideæ*. A genus of very popular, usually hardy, ornamental bulbous plants, of which probably not more than a score are entitled to specific rank. The genus is confined to Europe, North Africa, and North and West Asia. Flowers white or yellow, solitary or umbellate, drooping or inclined; spathe membranous; perianth tubular below, segments spreading, mouth surmounted by a circular corona or crown; stamens inserted in the tube, included within the crown; filaments free or adnate to the tube; scape compressed. Leaves linear (Rush-like) or strap-shaped.

Mr. Baker's grouping of the species and varieties, and of the known or presumed hybrids, as published in the "Gardener's Chronicle," 1884, is given below, with a few varieties added. In Series I., the names printed in the first left-hand column, in small capitals, represent the sub-genera, those in the second, in italics, indicate the admitted species; the third column contains the sub-species, and the fourth the varieties as understood botanically. In Series II., the first column of names represents what are regarded as primary types; those in the second are regarded as secondary types.

Series I. Genuine Species and their Varieties.

MAGNICORONATI.

Crown, or trumpet, as long as, or rather longer than, the divisions of the perianth.

I. CORBULARIA—

N. Bulbocodium
- citrinus
- conspicuus
- tenuifolius

Graellsii
- monophyllus
- nivalis

II. AJAX—

N. Pseudo-Narcissus

Pseudo-Narcissus proper { the Wild Daffodil of England
- abscissus (muticus)
- cambricus
- lobularis
- princeps
- Telamonius
- variiformis

} connecting links between Pseudo-Narcissus and major

bicolor
- lorifolius
- rugilobus

} connecting links between Pseudo-Narcissus and bicolor

major
- maximus
- obvallaris
- pallidus præcox
- propinquus
- spurius

minor
- minimus
- nanus
- pumilus

moschatus
- albicans
- cernuus
- tortuosus

MEDIOCORONATI.

Crown, or cup, half as long as the divisions of the perianth, but, in one or two cases, three-quarters as long.

III. GANYMEDES—

N. calathinus
N. triandrus
- cernuus
- concolor
- nutans
- pulchellus

IV. QUELTIA—

N. incomparabilis
- albidus
- aurantius

N. odorus (calathinus, Hort.)
- lætus
- minor (pseudo-juncifolius)
- rugulosus

N. juncifolius
- apodanthus
- rupicolus

Narcissus—*continued.*

PARVICORONATI.

Crown less than half as long as the divisions of the perianth.

V. HERMIONE—
N. Jonquilla
N. Tazetta
aureus
canariensis
chrysanthus
Bertolonii
dubius
intermedius
bicrenatus
bifrons
primulinus
radiatus
italicus
Luna
Barlæ
mediterraneus
ganymedoides
ochroleucus
orientalis
pachybulbus
Panizzianus
papyraceus (unicolor, niveus)
polyanthos
N. viridiflorus } autumn flowerers
N. serotinus } autumn flowerers
elegans } autumn flowerers
obsoletus } autumn flowerers

VI. EUNARCISSUS—
N. poeticus
majalis
patellaris
poetarum
recurvus
stellaris
radiiflorus (angustifolius, Ait.)
verbanensis

VII. AURELIA—
N. Broussonetii

[Five of the preceding thirteen species are, practically speaking, out of court as garden plants.]

Series II. Hybrids, Known or Presumed.

MEDIOCORONATI.

1. *Humei* (Hume's hybrid): incomparabilis × Pseudo-Narcissus
albidus
concolor
2. *Backhousei* (Backhouse's hybrid)
3. *Macleai* (MacLeay's hybrid): Pseudo-Narcissus × Tazetta
Bernardi
Nelsoni
Sabini
tridymus
4. *Leedsii* (Leeds' hybrid): montanus × Pseudo-Narcissus
5. *Barrii* (Barr's hybrid): poeticus × Pseudo-Narcissus
6. *poculiformis*=montanus (Salisbury's hybrid):? papyraceus × moschatus
Dr. Masters
galanthifolius

PARVICORONATI.

7. *gracilis*: juncifolius × Tazetta
tenuior
8. *Burbidgei* (Burbidge's hybrid): superpoeticus × Pseudo-Narcissus
9. *biflorus*:? poeticus × Tazetta
albus

[Nos. 3, 6, 7, 9, are old, the others recent.]

Culture. The numerous and very beautiful species and varieties of Narcissus are amongst the most popular and largely cultivated of spring-flowering bulbs. The majority are extremely accommodating, as they thrive in almost any soil and situation, and may be left alone for several years after once being planted. A rather deep and somewhat stiff soil is, however, that in which the bulbs succeed best; and if the position is one partially shaded from hot sunshine in spring, the flowers of some of the species retain their beauty for a much longer period than they would if exposed to all the light and sunshine possible. Narcissi are well adapted for planting by the sides of lakes or ponds and in mixed flower or shrubbery borders. They are also suitable for naturalising in any quantity, in the grass, by the sides of woodland walks, in open spaces between trees or shrubs, and in any other position where the flowers may be readily seen on their appearance in spring. The foliage should not be cut off when green, but allowed to die naturally each year, and then be removed. Transplanting, or any division of the bulbs, is best performed during the months of July and August—the season when, according to Mr. Burbidge, they are usually dormant, and quite free from roots. Mr. Barr's experience is that new roots are made simultaneously with the dying of the old ones, and this in July or August. If this operation be deferred until later in autumn, more or less injury or check to the new growth must take place. The usual mode of propagation is by offsets, which should be collected from the parent bulbs, and planted out separately, for a year, in order that they may grow sufficiently large for flowering. The majority of the species increase somewhat freely by this method, and permanent clumps or collections may be lifted at the season above named, and their offsets removed, should there be a danger of injury, caused by the flowering bulbs being overcrowded, arising from their multiplying. The process of raising plants from seed is a slow one, but still it may be practised with a view to obtaining new varieties. Seeds should be sown, soon after being collected, in pans of sandy and rather loamy soil. Young bulbs should be planted in a prepared border; a two-year-old bulb would not be much thicker than a corn straw, and would not want more than ½in. or 1in. space; afterwards, when it becomes necessary, more room should be allowed. Seedling bulbs are not usually at their best the first year of flowering; consequently, their merits should not be too hastily judged. An annual top-dressing of loam and decayed manure may be applied with material advantage to all Narcissi when the dead foliage is removed.

Narcissus—*continued.*

Pot Culture, Forcing, &c. Varieties of Polyanthus Narcissi are very extensively cultivated in pots for greenhouse decoration, and for the use of their highly fragrant flowers in a cut state. Every sort that can be obtained, either with single or double flowers, is well worth growing in pots, and all are suitable for planting outside as well. Early Paper White and Double Roman are two excellent forcing varieties, which may be had in flower from November onwards, till spring, by potting successionally, and forcing very gradually.

FIG. 630. NARCISSUS BIFLORUS, showing Habit and detached Flowers.

Double and single sweet-scented Jonquils (*N. Jonquilla*) are very fragrant when in flower, and are well adapted for pot culture, as are also *N. poeticus*, and its finely-formed variety, *ornatus*. The Hoop Petticoat Narcissus (*N. Bulbocodium*) thrives admirably in 5in. pots, with three to six bulbs in each, or in small pans, if kept in a cold frame, in winter, and allowed to grow and flower without artificial heat. The varieties of the sections *Ajax* and *Queltia*, and, indeed, all Narcissi, are now being largely grown in pots. The *Triandrus* varieties, grown in pots,

Narcissus—*continued.*

are perfect gems. All the above-named succeed in the same sort of soil and under similar treatment to that given to Hyacinth bulbs (*see* **Hyacinthus**). The Paper White and Double Roman varieties may be forwarded, in heat, when their flower scapes can be seen; all the others are best if grown throughout in a cool frame.

FIG. 631. NARCISSUS BULBOCODIUM.

N. abscissus (cut off). A form of *N. Pseudo-Narcissus.*

N. albicans (whitish). A form of *N. Pseudo-Narcissus moschatus.*

N. albus (white). A form of *N. biflorus.*

N. angustifolius (narrow-leaved). A synonym of *N. poeticus radiiflorus.*

Narcissus—*continued.*

N. biflorus (two-flowered).* *fl.* from fifteen to eighteen lines across when expanded; tube about 1in. long, exclusive of the ovary; divisions milk-white, spreading horizontally when expanded, ⅜in. to ½in. long, ¼in. to ⅜in. broad, obovate, much imbricated, blunt or cuspidate; crown one to one and a-half lines deep, less spreading than its close ally, *N. poeticus*, yellow, about ¼in. across, the edge conspicuously crispato-crenulate; scape with two salient edges, bearing typically two, rarely one or three, flowers. May. *l.* about four to a scape, ⅜in. to ½in. broad, slightly glaucous, flattish, bluntly keeled, often more than 1ft. long. Bulb ovoid, more than 1in. thick. Europe (naturalised in Britain). Supposed to be a hybrid between *N. poeticus* and *N. Tazetta.* See Fig. 630. (B. M. 197; N. 41.) *albus* is a white-flowered form.

N. bifrons (two-faced). A form of *N. Tazetta intermedius.*

N. Broussonetii (Broussonet's). *fl.* greenish at the base, white upwards, with the tube eight or nine lines long, exclusive of the ovary, under one line thick; divisions of the limb sub-campanulately erecto-patent, pure white, oblong-lanceolate, about ¼in. long by ⅛in. broad, narrowed suddenly to a bluntish point; crown almost entirely confluent with the apex of the tube; scape about 1ft. high, from four to eight-flowered. Spring. *l.* about four to a scape, four to six lines broad, usually equalling the scape. Bulb ovoid, as large as a hen's egg. Mogadore. (N. 47.)

FIG. 632. NARCISSUS BULBOCODIUM CONSPICUUS.

N. Bulbocodium (Bulbocodium).* Hoop Petticoat. *fl.* bright yellow; perianth gradually widened from the ovary to the mouth of the crown, eighteen to twenty-one lines deep, exclusive of the ovary; tube and crown very nearly equal in depth, the latter scarcely at all crisped, and very indistinctly toothed at the

FIG. 633. NARCISSUS BULBOCODIUM MONOPHYLLUS.

N. Barlæ (Barla's). A form of *N. Tazetta Luna.*

N. Bertolonii (Bertoloni's). A form of *N. Tazetta chrysanthus.*

N. bicrenatus (twice-crenate). A form of *N. Tazetta intermedius.*

throat; divisions of the limb ascending, linear, from one to three lines broad at the base, narrowed gradually from the base to an acute point; scape 4in. to 8in. high, slender, terete, one-flowered, flower either ascending or horizontal. April and May. *l.* two or

Narcissus—*continued.*

three to a scape, sub-terete, 4in. to 8in. long, not more than one line broad. Bulb ovoid, ½in. to ⅝in. thick. South-west Europe, North Africa, &c., 1629. See Fig. 631. (N. 1.)

N. B. citrinus (citron). This only differs from the type in its somewhat larger beautiful sulphur-yellow flowers.

N. B. conspicuus (conspicuous). A robust form, with a slightly expanded corona and exserted style. SYN. *N. conspicuus.* See Fig. 632. (S. B. F. G. ser. ii. 326.)

N. B. Graellsii (Graells'). *fl.*, perianth 1in. long, above the ovary; divisions sub-patent, with a brown keel, which is decurrent to the base of the tube; scape 4in. to 6in. long. *l.* two or three. (B. M. 6473B, under name of *N. Graellsii.*)

N. B. monophyllus (one-leaved).* *fl.*, perianth and corona nearly white; style exserted. *l.* very slender, usually solitary. Algeria. See Fig. 633. (B. M. 5831; N. 33B.)

N. B. nivalis (snowy). *fl.*, perianth not more than eight to nine lines long above the ovary; divisions of the limb as long as the corona; scape 2in. to 4in. high. *l.* two or three.

N. B. tenuifolius (slender-leaved). A slender form, with erect, shining leaves, a distinctly exserted style, and a distinctly lobed corona. (S. B. F. G. 114.)

FIG. 634. NARCISSUS CALATHINUS, showing Habit and detached Flower.

N. calathinus (cup-like).* *fl.* fourteen to fifteen lines long, exclusive of the ovary; tube ½in. long, less than one line thick in the lower half, the same colour as the rest of the flower; divisions of the limb oblong-lanceolate, bluntish or sub-acute, four to four and a-half lines broad at the base, decidedly reflexed when the flower is fully expanded, white, or a very pale sulphur-yellow; crown the same colour as the divisions, and the same length; throat erecto-patent, scarcely at all plicate, with six shallow, rounded, sub-entire lobes; scape 8in. to 12in. high, very slender, terete, one or two flowers to a stem, on pedicels nine to fifteen lines long. *l.* generally two to a scape, very slender, green, one and a-half to two lines broad, concave. Bulb ovoid, not more than ½in. thick. Brittany. See Fig. 634. (N. 14.) The name *reflexus* has been indiscriminately applied to both this species and *N. triandrus*; the latter has always the perianth longer than the cup, whilst in *calathinus* the perianth and cup are equal in length.

N. cambricus (Cambrian). A form of *N. Pseudo-Narcissus.*

N. cernuus (drooping). A form of *N. Pseudo-Narcissus moschatus.*

N. conspicuus (conspicuous). A synonym of *N. Bulbocodium conspicuus.*

N. Cypri (Cyprian). A synonym of *N. Tazetta.*

N. deficiens (deficient). A synonym of *N. serotinus.*

N. dubius (doubtful). A synonym of *N. Tazetta dubius.*

N. Gouani (Gouan's). A synonym of *N. incomparabilis.*

N. gracilis (slender). *fl.* pale sulphur-yellow, 1½in. to 2in. broad when expanded, usually one or two, rarely three; tube twelve to fourteen lines long, exclusive of the ovary, about one line thick; divisions obovate-cuspidate, spreading horizontally, ⅜in. to ½in. broad; crown two to two and a-half lines deep, cup-shaped, ⅜in. broad at the mouth, slightly plicate and crenulate, uniform in texture, a rather deeper yellow than the divisions; scape slightly compressed and two-edged, 1ft. high. April. *l.* four to six to a scape, very convex on the back, not more than three lines broad. Bulb ovoid, 1in. or more thick. Native country unknown. A hybrid between *N. juncifolius* and *N. Tazetta.* (B. R. 816.) SYN. *N. tenuior* (B. M. 379; N. 37).

N. Graellsii (Graells'). A synonym of *N. Bulbocodium Graellsii.*

N. incomparabilis (incomparable).* *fl.* always solitary, 2½in. to 2¾in. broad when expanded; tube nearly or quite 1in. deep, cylindrical, one and a-half to two lines thick at the middle, three lines at the throat; divisions spreading, slightly imbricated, 1in. long, generally a rather paler yellow than the crown, oblong-lanceolate, six to eight lines broad; crown six to seven lines deep, orange-yellow, nearly erect, much plaited at the throat, and furnished with six deep imbricated lobes, the mouth eight to

Narcissus—*continued.*

nine lines across. March and April. *l.* three or four to a scape, about 1ft. long, bluntly keeled, about ½in. broad, slightly glaucous. Bulb ovoid, 1in. to 1½in. thick. Europe, &c. (naturalised in Britain), 1629. (B. M. 121; N. 18-21.)

FIG. 635. NARCISSUS INCOMPARABILIS ALBIDUS PLENUS, showing Habit and detached Flower.

N. i. albidus (white). *fl.*, crown yellow, but the divisions a very pale sulphur-yellow or milk-white. The double form is the Orange Phœnix of gardens. See Fig. 635.

FIG. 636. NARCISSUS INCOMPARABILIS AURANTIUS.

N. i. aurantius (orange).* A robust form, with the crown orange, but the divisions a pale (sulphur) yellow. SYNS. *N. aurantius, N. Gouani.* See Fig. 636. Double forms of this are the Butter-and-Eggs and Nonpareil of gardens, which sometimes produce flowers 3in. across. See Fig. 637.

N. intermedius (intermediate). A synonym of *N. Tazetta intermedius.*

N. italicus (Italian). A synonym of *N. Tazetta italicus.*

N. Jonquilla.* Jonquil. *fl.* bright yellow, very fragrant; tube ten to eleven lines long, exclusive of the ovary; divisions of the limb spreading horizontally when fully expanded, ⅜in. to ½in. long, slightly imbricated, oblanceolate or obovate-cuspidate; crown saucer-shaped, not more than one line deep, the edge faintly

Narcissus—*continued.*

FIG. 637. NARCISSUS INCOMPARABILIS AURANTIUS FLORE-PLENUS.

crenulate, about ⅜in. across; scape equalling or shorter than the leaves, slender, sub-terete, two to six-flowered. April. *l.* one or two to a scape, 8in. to 12in. long, semi-cylindrical, channelled

FIG. 638. NARCISSUS JONQUILLA, showing Habit, detached Flower, and Portion of Leaf

down to face. Bulb ovoid, under 1in. thick. Spain, &c., 1596. See Fig. 638. (B. M. 15; N. 40.) A double form of this species is known as Queen Anne's Jonquil.

N. juncifolius (Rush-leaved). *fl.* one or two, rarely three, nearly sessile in the spathes, or elevated on pedicels ¼in. to 1in. long, tube seven to nine lines long, very slender, cylindrical, scarcely more than half a line thick; divisions bright yellow, patent, obovate, ⅜in. to ½in. long, ¼in. broad, cuspidate, decidedly imbricated; crown same colour as the divisions, obconical, faintly crenulate, two and a-half to three lines deep, four and a-half to five lines in diameter at the mouth; scape scarcely exceeding the leaves, very slender, and not at all two-edged. April. *l.* three or four to a scape, quite cylindrical, and Rush-like in shape, 4in. to 6in. long. Bulb ovoid, about ½in. thick. Spain and South France. (N. 27.)

N. j. apodanthus (stalkless-flowered). *fl.*, corona deeply six-lobed. *l.* rather glaucescent.

N. j. rupicolus (rock-loving). *fl.*, corona orange-yellow, cup-shaped, less than half as long as the perianth segments. (B. M. 6473c, under name of *N. rupicola.*)

N. lobularis (small-lobed). A form of *N. Pseudo-Narcissus.*

N. lorifolius (strap-leaved). A form of *N. Pseudo-Narcissus bicolor.*

N. Macleai (MacLeay's).* *fl.* ascending as in the Daffodil, fifteen to sixteen lines deep, exclusive of the ovary; tube cylindrical, seven to eight lines long, ⅛in. thick, white, tinged downwards with green; divisions milk-white, spreading at a right angle from the base of the crown, oblong-lanceolate, much-imbricated, eight to nine lines long, four and a-half to six lines broad, bluntish or sub-acute; crown five to six lines deep, bright yellow, very slightly plicate, ½in. broad at the mouth, slightly lobed; scape about 1ft. high, sub-compressed and slightly two-edged, one or rarely two-flowered. April. *l.* five or six to a scape, 8in. to 10in. high, ½in. broad, concave on the face. Bulb 1in. or more thick. Native

Narcissus – *continued.*

FIG. 639. NARCISSUS MACLEAI.

country uncertain. A hybrid between *N. Pseudo-Narcissus* and *N. Tazetta.* See Fig. 639. (B. M. 2588; B. R. 987; N. 17.)

N. maximus (greatest). A form of *N. Pseudo-Narcissus major.*

N. minimus (smallest). A form of *N. Pseudo-Narcissus minor.*

N. montanus (mountain). A synonym of *N. poculiformis.*

N. nanus (dwarf). A form of *N. Pseudo-Narcissus minor.*

N. obsoletus (obsolete). A form of *N. serotinus elegans.*

N. obvallaris (trenched-round). A form of *N. Pseudo-Narcissus major.*

FIG. 640. NARCISSUS ODORUS.

N. odorus (fragrant). *fl.* slightly fragrant, horizontal or ascending; perianth bright yellow, fifteen to twenty-one lines deep, exclusive of the ovary; tube six to nine lines long, ¼in. thick in the lower part, but wider at the throat; divisions nine to twelve lines

Narcissus—*continued.*

long, oblong-lanceolate, acute, very slightly paler than the corona, a fresh bright yellow, five to eight lines broad in the middle, usually imbricated for the lower half or third; crown five or six lines deep, plaited; throat sub-erect, more or less distinctly six-lobed, about ½in. across; scape 12in. to 15in. high, scarcely at all compressed or two-edged, generally two-flowered. April. *l.* three or four to a scape, nearly 1ft. long, two and a-half to three lines broad, very concave on the face, and convex on the back. Bulb ovoid, twelve to fifteen lines thick. Spain. See Fig. 640. (N. 23.) This species has several names, which are now all but obsolete (figured as *N. calathinus* in B. M. 934).

N. o. lætus (joyful). *fl.* smaller, and divisions shorter and blunter than in the type, scarcely more than half as long again as the crown. (B. M. 78, under name of *N. odorus.*)

N. o. minor (lesser). *fl.*, perianth and cup full yellow. A dwarf form. SYN. *N. pseudo-juncifolius.*

N. o. rugulosus (slightly wrinkled). *fl.*, perianth broad, imbricated; cup full yellow.

N. orientalis (Eastern). A synonym of *N. Tazetta orientalis.*

N. pachybulbus (thick-bulbed). A synonym of *N. Tazetta pachybulbus.*

N. pallidulus (palish). A synonym of *N. triandrus.*

N. pallidus præcox (palish, early). A form of *N. Pseudo-Narcissus major.*

N. papyraceus (paper). A synonym of *N. Tazetta papyraceus.*

FIG. 641. NARCISSUS POCULIFORMIS.

N. poculiformis (cup-like). *fl.* pure white, cernuous, odorous, eighteen to twenty-one lines long above the ovary; tube cylindrical, shorter than the divisions, line thicker in the lower half; divisions 1in. long, oblong-lanceolate, acute, often slightly twisted, ⅛in. to ¼in. broad at the middle; crown same colour as the rest of the flower, ⅛in. deep, moderately plicate and crenulate at the throat; scape 1ft. high, with one or two flowers. April. *l.* four or five to a scape, flattish, about ¼in. broad. Bulb 1in. thick. Probably a hybrid between *N. Tazetta papyraceus* and *N. Pseudo-Narcissus moschatus.* SYN. *N. montanus* (B. R. 123). See Fig. 641. (N. 16.)

FIG. 642. NARCISSUS POETICUS, showing Habit and detached Flower.

N. poeticus.* Poet's Narcissus. *fl.* from 1¾in. to 2in. across when expanded, with a distinct and agreeable odour; tube white, about 1in. long above the ovary; divisions a pure snow-white, obovate, blunt, or cuspidate, slightly imbricated, ½in. to ¾in., or sometimes, in cultivation, even 1in. broad; crown one to one and a half lines deep, saucer-shaped, very much crisped, with a bright scarlet edge, the mouth four to five lines across; scape 1ft. or more high,

Narcissus—*continued.*

compressed, and two-edged, one, or very rarely two-flowered. April. *l.* three or four to a scape, flat, with a blunt keel, glaucescent, often 1ft. or more long, ⅜in. to ½in. broad. Bulb ovoid, about 1in. thick. South Europe. A well-known plant. See Fig. 642. The principal varieties are as follows:

N. p. majalis (May). *fl.*, divisions of the perianth pure white, well-formed and generally flat; cup edged with saffron.

N. p. patellaris (broad-petalled). *fl.*, perianth pure white, flat, finely formed; cup large, edged with saffron. *l.* erect.

N. p. poetarum (poet's). An early form, with the expanded flower 2½in., or even 3in. across, and much-imbricated divisions. It is sometimes known as *N. p. grandiflorus.*

N. p. radiiflorus (ray-flowered). A more slender plant than he type, with narrower leaves, and obovate divisions of the limb of the flower so much narrowed downwards that they are not at all imbricated in the expanded flower, and also more narrowed at the point; crown rather narrower, and, consequently more erect. Flowers at least a fortnight earlier than the type. SYN. *N. angustifolius.* (B. M. 193.)

N. p. recurvus (recurved). A late-flowering form, with weak recurved leaves, and the divisions of the limb reflexed and crisped towards the edge. (N. 42A; S. B. F. G. ser. ii 188, under name of *N. recurvus.*)

N. p. stellaris (star-shaped). A late-flowering form, with the divisions of the limb, as in the variety *radiiflorus*, narrowed at the base, and not imbricated. (N. 42C; S. B. F. G. ser. ii. 132, under name of *N. stellaris.*)

N. p. verbanensis (Lago Maggiore). A very slender, late variety, with oblanceolate much-reflexed divisions (eight to nine lines long), which are yellowish at the base.

N. primulinus (rather early). A form of *N. Tazetta intermedius.*

N. princeps (princely). A form of *N. Pseudo-Narcissus.*

N. propinquus (related). A form of *N. Pseudo-Narcissus major.*

N. pseudo-juncifolius (Rush-leaved). A synonym of *N. odorus minor.*

N. Pseudo-Narcissus (bastard Narcissus).* Daffodil. *fl.* solitary, nearly sessile; perianth eighteen to twenty lines long above the ovary, the obconical tube about ½in. deep; divisions of the limb more or less ascending, sulphur-yellow, paler than the crown, oblong-lanceolate, nine to ten lines long, five to six lines broad at the base; crown just equalling the divisions, but deeper and more orange-yellow in colour; the mouth about 1in. across, slightly plicate and inciso-crenate; scape about 1ft. high, with two prominent edges. Early in March. *l.* five or six to a scape, glaucous, erect, flattish upwards, equalling, or, rather, shorter than the scape at the time of flowering. Bulb ovoid, 1in. to 1½in. thick. Europe (Britain), &c. (N. 3.) Of this, the Daffodil, there are five well-marked varieties (N. 4-13), which were known to, and described and named by, Linnæus, and which keep up their characters well enough under cultivation to stand as species for garden purposes. *abscissus* (*muticus*) is a variable form, with sulphur perianth and rich yellow trumpet. *cambricus* has sulphur-white perianth and yellow trumpet. *lobularis*, a dwarf form, has pale sulphur perianth and yellow trumpet. *princeps* has a sulphur-white perianth and yellow trumpet; flower very large and showy. *Telamonius*, the finest of this sub-group, has large, spreading, light yellow perianth, with channelled divisions, and large, handsome, yellow trumpet. *variiformis*, perianth ranging from white to primrose; trumpet from sulphur to deep yellow, the brim elegantly recurved.

FIG. 643. NARCISSUS PSEUDO-NARCISSUS MAJOR OBVALLARIS.

N. P.-N. bicolor (two-coloured). Stature of the type, and the flower the same size, but the corona a full bright yellow, forming a conspicuous contrast with the very pale sulphur-yellow divisions

Narcissus—*continued.*

of the limb. This is also known as *Ajax bicolor*. (B. M. 1187; N. 6.) The form *lorifolius* has a decidedly six-angled cup. *rugilobus* has a primrose-coloured perianth and yellow cup.

N. P.-N. major (greater). Larger in all its parts than the type; the leaves six to eight lines broad, the flower 2in. to 2¼in. long above the ovary; the divisions of the limb twice as long as the broadly obconical tube, the same colour as the crown, which slightly exceeds them, and spreads much more at the throat. (B. M. 51; N. 4.) The following are sub-varieties: *maximus*, with a greenish-yellow perianth, the tube of which is very short (S. B. F. G. ser. ii. 286, under name of *N. maximus*). *obvallaris* (Tenby Daffodil), perianth lighter yellow than the trumpet; the flower is of medium size: a remarkable variety, distinct from all others (see Fig. 643; B. M. 1301, under name of *N. major*). *pallidus præcox*, variable in shade of colour and size of flower; perianth and trumpet sulphur-white; the earliest and most beautiful of all Daffodils; it is a native of the French side of

FIG. 644. NARCISSUS PSEUDO-NARCISSUS MAJOR PALLIDUS PRÆCOX.

the Pyrenees (see Fig. 644). *propinquus* differs from *major* principally in the bluer green of the foliage and larger size of the flower. *spurius* is a very distinct, almost self-yellow form, with broad, imbricated hooded perianth, lying forward on a large expanded trumpet.

N. P.-N. minor (smaller). Smaller in all its parts than the type; the whole plant when cultivated not above 6in. or 8in. high; the leaves ¼in. broad, often only 3in. or 4in. long; the flower 1in. to 4in. long, exclusive of the ovary; the crown the same colour as

FIG. 645. NARCISSUS PSEUDO-NARCISSUS MINOR MINIMUS.

the divisions, and slightly exceeding them; divisions ¼in. broad at the base. (N. 5.) Mr. Baker refers the following to this as sub-varieties: *minimus*, a very small form, shown at Fig. 645 (B. M. 6, under name of *N. minor*); *nanus*, with flowers

Narcissus—*continued.*

intermediate in size between those of *minor* and *minimus* (see Figs. 646 and 647); and *pumilus*, with perianth segments about the length of the crown (S. B. F. G. ser. ii. 143, under name of *Ajax pumilus*).

FIG. 646. NARCISSUS PSEUDO-NARCISSUS MINOR NANUS.

N. P.-N. moschatus (musky). *fl.* at first a very pale sulphur-yellow, finally nearly white, large or middle-sized, the divisions narrower and more lanceolate than in the type, the crown the

FIG. 647. NARCISSUS PSEUDO-NARCISSUS MINOR NANUS.

same colour as the rest of the flower, equalling or slightly exceeding the divisions (B. M. 1300; N. 7.) The following are simply pale-flowered forms of the common Daffodil: *albicans*

FIG. 648. NARCISSUS PSEUDO-NARCISSUS MOSCHATUS CERNUUS.

cernuus (see Fig. 648; S. B. F. G. ser. ii. 101), and *tortuosus* (B. M. 924, under name of *N. moschatus*).

Narcissus—*continued.*

N. pumilus (dwarf). A form of *N. Pseudo-Narcissus minor.*

N. radiatus (rayed). A form of *N. Tazetta intermedius.*

N. recurvus (recurved). A synonym of *N. poeticus recurvus.*

N. rugilobus (wrinkled-lobed). A form of *N. Pseudo-Narcissus bicolor.*

N. rupicola (rock-loving). A synonym of *N. juncifolius rupicolus.*

N. serotinus (late-flowering). *fl.* usually solitary, rarely two together; tube, segments, and crown like those of *N. elegans*; scape very slender, under 1ft. high. September. *l.* solitary or two together, filiform, sub-terete, usually not appearing till the scape dies down. Bulb sub-globose, six to nine lines thick. South Europe, North Africa, Asia Minor. (N. 46.) SYN. *N. deficiens* (B. R. xxxiii. 22).

N. s. elegans (elegant). *fl.* usually from two to four; tube seven to eight lines long, under one line thick, greenish-white; divisions of the limb pure white, linear, very acute, six to eight lines long; crown yellowish, saucer-shaped, under one line deep, entire, or slightly crenulate; scape slender, flaccid, 6in. to 12in. long. September and October. *l.* one, or rarely two, flattish, channelled, one line or less broad, equalling or exceeding the scape. Bulb roundish, 1in. or less thick. Italy, Sicily, Algiers. (N. 45.) *obsoletus* is another form of this rare species, in which the corona is very minute.

N. spurius (spurious). A form of *N. Pseudo-Narcissus major.*

N. stellaris (star-shaped). A synonym of *N. poeticus stellaris.*

FIG. 649. INFLORESCENCE AND PORTION OF LEAF OF NARCISSUS TAZETTA.

N. Tazetta (Tazetta).* Polyanthus Narcissus. *fl.* fragrant, from 1in. to 1½in. across when expanded, usually four to eight; tube about ⅔in. long above the ovary; divisions of the perianth white, rather shorter than the tube, the alternate ones frequently narrower, all much imbricated, bluntish or cuspidate, four to five lines broad, spreading horizontally when fully expanded, or slightly reflexed; crown uniform bright yellow, two and a-half to three lines deep, the edge sub-entire or slightly crenulate or lobed. March. *l.* four to six to a scape, glaucescent, flattish, bluntly keeled on the back. Bulb 1½in. to 2in. thick, copiously tunicated with brown membranous coats. Europe. See Fig. 649. A well-known and widely-distributed species. SYN. *N. Cypri.* (N. 29-34.)

N. T. aureus (golden). *fl.* when expanded 1in. to 1½in. across; divisions bright yellow, ½in. to ⅝in. long, four to five lines broad, bluntish, and much imbricated; crown sub-entire, about one-third the length of the divisions, a deep orange-yellow; tube exceeding the limb. (B. M. 925, under name of *N. Tazetta.*)

N. T. canariensis (Canary Islands). *fl.*, crown scarcely more than one line long; tube extremely slender, ⅔in. long, swelling where it joins the limb; scape slender, bearing a seven-flowered umbel. *l.* scarcely more than ⅛in. wide.

N. T. chrysanthus (golden-flowered). *fl.* about 1in. across; divisions of the limb imbricated, narrowed to a point, lemon-yellow; crown sub-entire, golden-yellow, about two lines deep. scape six to ten-flowered. The form *Bertolonii* resembles *N. T. papyraceus*, but has smaller flowers and shorter perianth lobes.

N. T. dubius (doubtful). *fl.* two to six, six to nine lines across when expanded; tube cylindrical, pure white, five to six lines long, about one line thick; divisions pure white, ovate-oblong, three lines long, two and a-half lines broad, imbricated, patent or slightly reflexed, sub-obtuse or cuspidate; crown pure white, obconical, ⅛in. deep, slightly crisped, and crenulate at the throat, which is not more than three lines across; scape 6in. to 9in. long, slender, decidedly compressed and two-edged.

Narcissus—*continued.*

l. four to six to a scape, concave on the face, 5in. to 6in. long, one and a-half to three lines broad. Bulb ovoid, nine to twelve lines thick. South France, &c. (N. 28, and Fl. Ment. 71, under name of *N. dubius.*)

FIG. 650. NARCISSUS TAZETTA INTERMEDIUS.

N. T. intermedius (intermediate). *fl.* from twelve to fifteen lines across when expanded, the divisions obovate-cuspidate, lemon-yellow, five to seven lines long, four to four and a-half lines broad, much imbricated; crown two to two and a-half lines deep, slightly deeper in colour than the divisions, the edge a little plaited and crenulate; scape 1ft. or rather more high, sub-terete, from two to five-flowered. *l.* three or four to a scape, sub-cylindrical, from two and a-half to three lines broad. Bulb ovoid, 1in. or more thick. Spain, &c. See Fig. 650. (Fl. Ment. 41, under name of *N. intermedius.*) To this the following sub-varieties are referred by Mr. Baker: *bifrons*, with narrow lobes and a deep crown; *bicrenatus* and *primulinus*, with broader, much imbricated lobes, and a shallower, more open, crown; *radiatus*, with oblong-lanceolate, less imbricated divisions, and a six-lobed crown (N. 38).

N. T. italicus (Italian). *fl.*, scape slender, distinctly two-edged, producing from six to ten flowers, which are from 1½in. to 2in. across when expanded; divisions eight to ten lines long, about equalling the tube, narrowed gradually to a point, slightly imbricated, pale lemon-coloured; crown sulphur-yellow, two to two and a-half lines deep, distinctly six-lobed. SYN. *N. italicus.* (B. M. 1188.)

N. T. Luna (Luna). *fl.* fewer than in *N. T. papyraceus*, about 1in. broad when expanded, with oblong, much-imbricated lobes. *Barlæ* is a slight form from Italy.

N. T. mediterraneus (Mediterranean). This differs from the type by the narrower divisions of the flower, which are not more than ⅛in. broad, not at all imbricated, and more lengthened out at the point. *ganymedoides* is a sub-variety with the divisions slightly reflexed.

N. T. ochroleucus (yellowish-white). *fl.* when expanded 1in. to 1½in. across; divisions milk-white, ⅛in. broad, much imbricated; crown citron-yellow, with a sub-entire edge, nearly half as long as the divisions. *l.* greener, and more convex on the back, and stem more nearly terete than in the variety *polyanthos.* SYN. *Hermione tereticaulis.* (S. B. F. G. ser. ii. 179.)

Narcissus—*continued.*

N. T. orientalis (Oriental). This differs from the type in its crown, which is more manifestly trilobate, more crenulate, and patent. (B. M. 940, under name of *N. orientalis α.*)

N. T. pachybulbus (thick-bulbed). *fl.* pure white, six to seven lines across; tube ½in. long above the ovary, the segments of the limb not more than ½in. long, roundish, much imbricated, cuspidate; crown not more than one line deep, sub-entire; scape under 1ft. high, compressed and ancipitous, five to eight-flowered. *l.* four or five to a scape, glaucescent, about ½in. broad, flattish. Bulb ovoid, 2in. or more thick. Algeria. (N. 39, under name of *N. pachybulbus.*)

N. T. Panizzianus (Panizzi's). *fl.*, when expanded, nine to ten lines across; crown sub-entire, pure white. A small form, closely allied to the variety *papyraceus*, but more slender, and smaller in all its parts. (N. 36.)

N. T. papyraceus.* Paper-white Narcissus. *fl.* when expanded 1½in. to 1¾in. across; tube greenish-white, eight to nine lines long above the ovary; divisions pure white, three to four lines broad, generally narrowed gradually to a point, and moderately imbricated; crown two to two and a-half lines deep, with a crenulate edge. *l.* glaucescent, ½in. to ⅝in. broad. Stem ancipitous. SYN. *N. papyraceus.* (N. 35.)

N. T. polyanthos (many-flowered). *fl.* from eight to twenty, 1in. to 1½in. across when fully expanded; divisions pure white, four or five lines broad, imbricated, bluntish or cuspidate, equalling or shorter than the tube; crown about one-third as long as the divisions, at first a very pale yellow, finally becoming nearly the same colour as the divisions, slightly plicate, the edge sub-entire.

N. Tazetta (Tazetta), of Gawler. A synonym of *N. T. aureus.*

N. Telamonius (Telamonius). A form of *N. Pseudo-Narcissus.*

N. tenuior (slenderer). A synonym of *N. gracilis.*

N. tortuosus (twisted). A form of *N. Pseudo-Narcissus moschatus.*

FIG. 651. NARCISSUS TRIANDRUS.

N. triandrus (three-stamened).* *fl.* horizontal or cernuous, measuring from nine to ten lines from the top of the ovary to the top of the crown; tube cylindrical, under half a line thick in the lower half, pure white, like the reflexed divisions of the limb, which just equal it in length, and are lanceolate, acute, one and a-half to two lines broad at the base; crown pure white, obconical, two and a-half to three lines deep, erecto-patent and entire at the throat; scape very slender, 6in. to 12in. long, one or two-flowered. April. *l.* very slender, semi-cylindrical, 6in. to 8in. long, three to four to a scape, under one line broad. Bulb not more than ½in. thick. Spain. SYN. *N. pallidulus.* See Fig. 651. (B. M. 6478; N. 15.) The following are some of the better-known varieties of this species:

N. t. cernuus (drooping). *fl.* one or two, pale yellow; crown a rather deeper yellow; both divisions and crown rather larger than in the type. SYN. *N. triandrus.* (B. M. 48.)

N. t. concolor (one-coloured). *fl.* two to four; divisions and crown pale yellow, the same size as in the type. SYN. *Ganymedes concolor.* (S. B. F. G. ser. ii. 113.)

N. t. luteus (yellow). A synonym of *N. t. pulchellus.*

N. t. nutans (nodding). *fl.* two or three; crown a deeper yellow than the divisions, crenulate. SYN. *N. trilobus.* (B. M. 945.)

N. t. pulchellus (pretty). *fl.* three to four; corona white; divisions bright yellow. SYNS. *N. t. luteus* (B. M. 1262) and *Ganymedes pulchellus* (S. B. F. G. ser. ii. 99).

N. triandrus (three-stamened), of Curtis. A synonym of *N. t. cernuus.*

N. trilobus (three-lobed). A synonym of *N. triandrus nutans.*

N. variiformis (variously-formed). A form of *N. Pseudo-Narcissus.*

N. viridiflorus (green-flowered). *fl.* with a Jonquil-like odour; tube seven to eight lines long; divisions slightly shorter, greenish, linear, very acute, spreading horizontally, not more than one line broad in the lower part; crown very minute, with six roundish, sub-marginate lobes; scape slender, one to four-flowered. Autumn. *l.* solitary or in twos, slender, terete, fistulose, about 1ft. long. Bulb small, globose. Spain, 1629. (B. M. 1687; N. 44.)

Narcissus—*continued.*

Garden Varieties. Very few of the numerous varieties of *Narcissus* may be considered unworthy of cultivation. Many of the Narcissi may be employed for naturalising, and for shrubbery border decoration, when they can be procured in quantity at a cheap rate. Subjoined is a list of the best varieties, selected from the different groups and divisions that have been arranged. We are indebted to Mr. Peter Barr for the illustrations here given, as well as for several of those used in the species.

Group I. Magnicoronati (*Ajax, or Pseudo-Narcissus*).

TRUMPET DAFFODILS—GOLDEN.

Blondin. Perianth yellow, and channelled; trumpet full yellow, and large.

Captain Nelson. Perianth rich yellow, and very large; trumpet long, broad, and spreading.

Edith Barber. Perianth full primrose; trumpet yellow. A dwarf grower.

Emperor. Perianth deep primrose; trumpet rich full yellow. Very large flower.

Hudibras. Perianth yellow, broad, imbricated, and longer than the deep yellow trumpet. Very distinct.

J. G. Baker (*volutus*). Perianth and trumpet rich primrose. A very distinct variety.

John Nelson. Flower of an almost uniform yellow, drooping, large, rounded. Very distinct.

Major superbus. Perianth broad and firmly set; trumpet large, and gracefully flanged. This is one of the most distinct of Mr. Leeds' yellow Daffodils.

M. J. Berkeley. Flower of a uniform rich deep yellow. The largest of all yellow trumpet Daffodils.

Randolph Churchill. Perianth long, and elegantly twisted; trumpet full yellow, long, narrow, and elegantly lobed.

Shirley Hibberd. Trumpet deep yellow, large, expanded, with lighter yellow divisions of perianth slightly twisted. Distinct.

Spurius coronatus. This is remarkable for its large, broad, expanded yellow trumpet, and lighter yellow spreading divisions of perianth.

Thomas Moore. Perianth light yellow; trumpet long, narrow, regularly lobed, rich, full yellow. Distinct.

TRUMPET DAFFODILS—TWO-COLOURED.

Dean Herbert. Perianth full primrose, changing to sulphur; trumpet rich yellow. Very large.

Empress. Perianth white, and of great substance; trumpet rich yellow. A very large flower.

Grandis. Perianth pure white, large, and finely imbricated; trumpet full yellow, very large. The finest of the Bicolor varieties.

Horsfieldii. Perianth white; trumpet rich yellow. Very large flower.

James Walker. Perianth sulphur-white, elegantly imbricated; trumpet large, handsome.

J. B. M. Camm. Perianth white and very graceful; trumpet primrose, elegantly formed. Distinct.

Michael Foster. Perianth sulphur-white, large; trumpet rich yellow, large, thick. Very distinct.

Mrs. J. B. M. Camm. Perianth white, elegant; trumpet sulphur-white. Very graceful and distinct.

Nobilis. Perianth white, shading to primrose; trumpet orange-yellow, broadly expanded at brim, fringed and lobed.

TRUMPET DAFFODILS—WHITE OR WHITISH.

Cernuus pulcher. Perianth silver-white; trumpet primrose, passing to white, large, bold, spreading.

Colleen Bawn. Perianth pure white, broad, and twisted; trumpet pale sulphur, passing to white.

C. W. Cowan (*Cowani*). Perianth white; trumpet sulphur. Very distinct and elegant.

Dr. Hogg. Perianth white; trumpet primrose, passing to white, long, smooth at brim, elegantly recurved.

Exquisite. Perianth sulphur-white; trumpet primrose, passing to white. Early, and very distinct.

F. W. Burbidge. Perianth white; trumpet sulphur, passing to white, long-ribbed, and elegantly gashed. Very distinct.

Gertrude Jekyll. Perianth and trumpet almost uniform sulphur. Very distinct.

Mrs. F. W. Burbidge. Perianth white; trumpet primrose, passing to snow-white, straight, in the way of F. W. Burbidge and flowers same time.

Narcissus—*continued.*

Rebecca Syme (the Violet-scented Daffodil). Perianth white; trumpet citron. This variety is as remarkable for its refined beauty as for its exceptional Violet fragrance.

St. Bridgid. Perianth pale sulphur-yellow; trumpet canary. A large and very handsome flower.

Sir Stafford Northcote. Perianth white; trumpet pale sulphur, long. Very distinct.

Tortuosus (the Great Tortuose White Spanish Daffodil). Perianth pure white, usually twisted, and somewhat shorter than the trumpet, which is pale sulphur, changing to snow-white.

William Goldring. Perianth snow-white, long, dog-eared, completely enveloping the primrose trumpet. The arching of the stem, and drooping of the flower, fairly entitle this variety to the name "Swan's Neck Daffodil."

W. P. Milner. Perianth and trumpet sulphur. Small, neat flower; very distinct.

TRUMPET DAFFODILS—DOUBLE.

Capax plenus (Queen Anne's Double Daffodil). Flowers of a pale lemon colour, very handsome.

Cernuus flore elegantissimo pleno (The Double White Trumpet Daffodil).

Grandiplenus (The Dwarf Double Light Yellow). This flower spreads to a large size when fully open, and a fine specimen will show as many as ten or twelve centres, from which petaloid bodies radiate, thus having the appearance of ten or twelve small Narcissi bound together.

Nanus plenus. This is supposed to have been raised from seed by Dr. Brown, of Hull.

Plenissimus (John Tradescant's Great Rose Daffodil).

FIG. 652. NARCISSUS PSEUDO-NARCISSUS PLENUS, showing Habit and detached Flower.

Pseudo-Narcissus plenus (The Double Lent Lily, or Gerard's White and Yellow Double Daffodil). See Fig. 652.

Telamonius plenus (Wilmer's Great Double Golden-yellow Daffodil).

Group II. Mediocoronati.

INCOMPARABILIS (NONSUCH YELLOW DAFFODILS, WITH CHALICE-SHAPED CUP).

Autocrat. Perianth yellow; cup yellow, and much expanded.

Beauty. Perianth sulphur, barred yellow; cup margined orange, large. Remarkably large distinct flower.

C. J. Backhouse. Perianth yellow, medium size; cup rich orange-scarlet, very large and long. The most remarkable and attractive of the yellow forms of *incomparabilis.*

Concolor. Perianth yellow; cup yellow.

Darling (*marginatus*). Perianth sulphur; cup yellow, edged orange.

Edward Hart. Perianth and cup full yellow. Very distinct.

Figaro. Perianth yellow; cup stained orange-scarlet, large and spreading. Large flower.

Frank Miles. Perianth yellow; cup large and neat. Very large and remarkable.

Gloria Mundi. Perianth medium size; cup heavily stained bright orange-scarlet, large, and very much expanded.

Hogarth. Perianth primrose; cup yellow, large, and spreading. Very distinct.

John Bull. Perianth sulphur; cup large and spreading. Large flower.

King of the Netherlands. Perianth sulphur; cup stained orange, very large, spreading. Very distinct and beautiful.

Leedsii. Perianth yellow; cup heavily stained with orange-scarlet.

Narcissus—*continued.*

Longshanks. Perianth sulphur; cup large. Plant tall.

Magog. Perianth sulphur; cup large. Fine large flower.

Mrs. A. F. Barron. Perianth yellow; cup margined with bright orange-scarlet, straight and narrow. Flower small, and very neat.

Queen Sophia. Perianth sulphur; cup heavily stained orange-scarlet, very large, spreading, and frilled. Very distinct.

Sir Watkin. Perianth rich sulphur; cup yellow, tinged with orange. The largest in the section.

Sulphureus. Perianth sulphur; cup yellow.

Titian. Perianth yellow; cup margined orange. Flower large.

INCOMPARABILIS (PEERLESS, WHITE OR WHITISH DAFFODILS).

Albert Victor. Perianth sulphur-white, large; cup large, and elegantly expanded. Very distinct.

Albidus. Perianth sulphur-white; cup yellow.

Albus. Perianth white; cup yellow.

Annie Baden. Perianth sulphur-white; border of cup elegantly contracted and stained orange.

Bertie. Perianth sulphur-white, broad; cup yellow, edged orange. A beautiful plant.

Cynosure. Perianth primrose, changing to white, large; cup conspicuously stained orange-scarlet, large. Remarkably showy.

Fair Helen. Perianth creamy-white and well-formed; cup elegantly edged with orange, straight.

Gog. Perianth creamy-white, large; cup yellow, large.

Goliath. Perianth white, barred yellow, large; cup yellow, large.

Harpur-Crewe. Perianth white; cup fine yellow.

Lorenzo. Perianth soft primrose, changing to white, slightly dog-eared; cup yellow. Very distinct.

Mary Anderson. Perianth pure white; cup bright orange-scarlet. Very distinct.

Mrs. Syme. Perianth sulphur-white, short; cup yellow, large, and spreading. Flower comparatively small. Plant tall, very distinct.

Princess Mary. Perianth creamy-white, broad, and well imbricated; cup suffused orange-scarlet, large, very much expanded, and perfectly smooth. Fine form.

Queen Bess. Perianth white, large; cup light yellow, large, much expanded. Very distinct.

Semi-partitus. Perianth pale primrose; cup sulphur, deeply and distinctly lobed. A remarkable flower.

Stella. Perianth white, large; cup yellow, fine.

BARRII (BARR'S YELLOW DAFFODILS, WITH SHORTENED CHALICE-SHAPED CUP).

Barrii. Perianth and cup yellow, going off primrose.

Conspicuus. Perianth yellow, going off sulphur, large, broad, spreading; cup conspicuously stained orange-scarlet, broad, short. A remarkable flower, of great beauty.

Golden Gem. Perianth rich full yellow, passing to primrose; cup yellow, edged orange.

Mimico. Perianth sulphur; cup yellow. Very fine.

Orphée. Perianth primrose, changing to sulphur; cup yellow, edged orange.

BARRII (BARR'S WHITE OR WHITISH DAFFODILS, WITH SHORTENED CHALICE-SHAPED CUP).

Ada. Perianth sulphury-white; cup yellow.

Albus. Perianth pure white; cup yellow, tinged orange.

Beatrice Murray. Perianth creamy-white; cup canary, elegantly edged with orange. Very distinct.

Flora Wilson. Perianth pure white, large; cup canary, strongly edged with scarlet.

General Murray. Perianth creamy-white, broad; cup canary, elegantly edged orange. Very distinct.

Maurice Vilmorin. Perianth creamy-white, broad; cup lemon, conspicuously stained with orange-scarlet. Very distinct.

Miriam Barton. Perianth primrose; cup canary, large.

Romeo (*primulinus*). Perianth creamy-white, dog-eared; cup canary. Very distinct.

S. A. de Graaf. Perianth white, finely formed; cup stained with orange-scarlet, spreading.

Sensation. Perianth pure white, large; cup canary, conspicuously edged orange-scarlet. Very striking flower.

William Ingram. Perianth white; cup primrose, conspicuously stained orange-scarlet, elegant.

Narcissus—*continued.*

LEEDSII (LEEDS' EUCHARIS-FLOWERED WHITE DAFFODILS, WITH WHITE OR PRIMROSE CHALICE-SHAPED CUP).

Acis. Perianth white; cup elegantly stained orange, changing to white.

Albion. Perianth white, large and starry; cup canary.

Amabilis. Perianth white, large, and spreading; cup passing from primrose to white, long and conspicuous.

Arsinoe. Perianth white; cup canary. Medium-sized flower.

FIG. 653. NARCISSUS LEEDSII BEATRICE.

Beatrice. Perianth white, fine form; cup changing from lemon to white, remarkably elegant. Of the white hybrids, this is the purest, and possesses the highest type of beauty. See Fig. 653.

Ceres. Perianth white, neat, and small; cup edged with orange.

Circe (*gloriosus*). Perianth white; cup changing from canary to white.

Duchess of Brabant. Perianth white; cup canary.

Duchess of Westminster. Perianth white, large; cup canary, tinged orange on first expanding, long. Distinct and very handsome.

Elegans. Perianth white, large, drooping, and somewhat shouldered; cup primrose, sometimes stained apricot, long. Very distinct.

Fanny Mason. Perianth white; cup canary. Medium-sized flower.

Flora. Perianth white; cup stained orange. On first opening, the flowers are drooping.

Gem. Perianth white, of model form; cup lemon, passing to white. Very distinct.

Grand Duchess. Perianth white, and starry; cup changing from stained orange to white, spreading.

Hon. Mrs. Barton. Perianth white, large, and broad; cup changing from primrose to white. A remarkable variety.

Ianthe (*Vincenti delicatus*). Perianth white; cup canary. Medium-sized flower.

Katherine Spurrell. Perianth white, broad, and overlapping; cup canary. Large flower; very distinct.

Leedsii. Perianth white, and somewhat starry; cup lemon, changing to white.

Madge Matthew. Perianth white, large; cup passing from canary to primrose, elegant.

Maria Magdaline de Graaff. Perianth white; cup suffused orange. Usually two-flowered. Very distinct in flower and foliage; the latter is broad and drooping.

Minnie Hume. Perianth white, large; cup changing from canary to white, large and spreading. A remarkable variety.

Mrs. Langtry. Perianth white, broad; cup white, large. A very distinct flower.

Palmerston. Perianth white; cup canary.

Princess of Wales. Perianth white, small, and neat; cup opening canary, changing to white, large and spreading. A gem.

Queen of England. Perianth white, large; cup canary, large, expanded, style of Minnie Hume.

Superbus. Perianth white, large, and dog-eared; cup passing from primrose to white.

HUMEI (HUME'S DOG-EARED DAFFODILS, WITH STRAIGHT CROWN).

Concolor. Perianth and trumpet uniform yellow. A very remarkable hybrid.

Giant. Perianth yellow, changing to sulphur; trumpet yellow. Flower very large, and of extraordinary character.

Sulphur. Perianth sulphury-white; trumpet yellow. A very distinct plant.

Narcissus—*continued.*

BACKHOUSEI (BACKHOUSE'S DAFFODILS, WITH COFFEE-CUP-SHAPED CROWN).

Backhousei. Cup yellow, long, nearly equalling the spreading sulphury perianth. Flowers horizontal, with distinct basal tube. Of bold habit.

William Wilks. Perianth primrose, spreading, closely imbricated; trumpet striking orange-yellow, frilled at the brim. Very distinct.

Wolley Dod. Perianth primrose, large, spreading; trumpet deep yellow, short. A very distinct, handsome Daffodil.

NELSONI (NELSON'S DAFFODILS, WITH GOBLET-SHAPED CROWN).

Aurantius. Perianth white, broad, flat, and spreading; cup suffused with orange-scarlet, ribbed, and expanding at the mouth.

Expansus. Perianth white, broad, flat, and spreading; cup yellow, and expanding.

Margaret Jones. Perianth sulphur-white, somewhat wavy; cup yellow. A hybrid of Mr. Leichtlin's (Empress × *Poeticus grandiflorus*).

Minor. Perianth white; cup yellow. Flower small, and comparatively dwarf; distinguished by pistil projecting beyond mouth of the cup.

Mrs. C. J. Backhouse. Perianth pure white, and broad; cup yellow, and very long.

Nelsoni. Perianth white, large; cup yellow, usually suffused orange on first opening, straight.

Pulchellus. Perianth white; cup yellow. Flower of somewhat drooping character on first opening; distinguished by the campanulate shape of the imbricated perianth.

Stanley. Perianth white, large, and rigid; cup yellow.

William Backhouse. Perianth white; cup yellow. Evidently the same cross as *Nelsoni major*, but with a pure yellow cup, thus showing that Mr. Leeds and Mr. Backhouse, in crossing, used similar flowers.

BERNARDI (BERNARD'S PYRENEAN DAFFODILS).

Bernardi. Perianth white; cup yellow. Sturdy foliage. The Hon. Mrs. Barton, Straffan House, county Kildare, collected this handsome hybrid a few miles from Luchon, on the Pyrenees, 1878, and it has been verified by Mr. Burbidge as the type Bernardi.

Fritton Decoy. Perianth white; cup yellow, edged with orange.

H. E. Buxton. Perianth white; cup suffused with orange-scarlet.

TRIDYMUS (TRIPLE-CROWN DAFFODILS).

A. Rawson. Flowers yellow, large, bold, well imbricated.

Duchess of Albany. Perianth sulphur; cup yellow.

Duke of Albany. Perianth sulphur; cup orange.

Grand Duke of Hesse. Perianth creamy-white; cup yellow.

Innocence. Perianth sulphur-white, small; cup yellow.

Princess Alice. Perianth creamy-white; cup orange.

S. A. de Graaff. Flowers bold yellow, changing to primrose, large, well imbricated; cup yellow.

Tridymus. Perianth and cup yellow. Plant somewhat recumbent.

THE DOUBLE-FLOWERED NONSUCH AND PEERLESS DAFFODILS (*Incomparabilis plenus*).

Albus plenus aurantius (Eggs and Bacon, Orange Phœnix). Double white, with orange nectary.

Albus plenus sulphureus (Codlings and Cream, Sulphur Phœnix). The Double White Peerless Daffodil, with sulphur nectary.

Aurantius plenus (Butter and Eggs, Golden Phœnix). Double yellow, orange nectary.

QUEEN ANNE'S DOUBLE JONQUIL.

Odorus minor plenus. Flowers of a rich full yellow, not unlike a small double yellow rose.

Group III. Parvicoronati.

BURBIDGEI (BURBIDGE'S POETICUS DAFFODILS, WITH SAUCER-SHAPED CUP).

Agnes Barr. Perianth creamy-white; cup yellow.

Baroness Heath. Perianth primrose, changing to white; cup suffused with orange, drooping. Foliage strong. Very distinct.

Beatrice Heseltine. Perianth creamy-white, passing to pure white; cup conspicuously edged with orange-scarlet, as in *conspicuus*.

Boz. Perianth yellow; cup citron, and plaited.

Narcissus—*continued.*

FIG. 654. NARCISSUS BURBIDGEI.

Burbidgei. Perianth clear white; cup margined with cinnabar-red. Very early, and useful for cutting. See Fig. 654.

Conspicuus. Perianth sulphur-white, passing off white; cup conspicuously edged with orange-scarlet, and expanded.

Crown Prince. Perianth creamy-white, broad; cup canary, margined with orange. Foliage strong, erect.

Crown Princess. Perianth white; cup canary, margined with orange. Foliage strong, drooping. Very distinct.

Edith Bell. Perianth alabaster-white, changing to pure white; cup canary, margined with orange. Very distinct.

Ethel. Perianth primrose; cup yellow.

Falstaff. Perianth white; cup lemon.

Gracilis. Perianth sulphur-white; cup plaited and tinted with orange, spreading.

Guinever. Perianth white, compact; cup canary, frilled.

John Bain. Perianth large white; cup citron.

Little Dirk. Perianth passing from yellow to creamy-white, short, neat, compact; cup conspicuously edged orange-scarlet. The smallest of the group; very beautiful.

Little John. Perianth creamy-white, passing to white, compact; cup yellow, small, plaited.

Mary. Perianth white; cup suffused with orange, expanded.

Model. Perianth clear white, compact; cup stained with orange, frilled.

Ossian. Perianth white; cup yellow, large, broad expanding.

Primrose Star. Perianth primrose, neat; cup yellow.

Princess Louise. Perianth white, sharply pointed; cup tinged orange, expanded.

St. John's Beauty. Perianth white, large; cup lemon, tinged with orange.

Sulphur Star. Perianth sulphur-white; cup canary, edged with orange.

Thomas Moore Absolon. Perianth white; cup citron, elegantly expanded.

Vanessa. Perianth yellow, passing to primrose, neat, compact; cup yellow, expanded. A perfect flower.

POETICUS (THE PURPLE-RINGED POET'S DAFFODILS).

Marvel. Perianth pure white; cup margined with saffron. A small, bladder-like, distended spathe, about 1in. long, appears weeks before the flower, and out of this, in due course, emerges the blossom. Very beautiful, and distinct.

FIG. 655. NARCISSUS POETICUS ORNATUS.

Ornatus. Perianth pure white, broad, and well formed; cup margined with scarlet. Early and very fine; one of the best and most useful. See Fig. 655.

Narcissus—*continued.*

Tripodalis. Perianth pure white, reflexed; cup deeply margined scarlet.

POLYANTHUS NARCISSUS (THE BUNCH-FLOWERED DAFFODILS).

Apollo. Perianth primrose; cup deep yellow.

Bathurst. Perianth primrose; cup orange.

Bazelman Major. Perianth white, broad, large; cup stained orange.

Florence Nightingale. Perianth white; cup deep orange. Extra fine; dwarf.

Gloriosus. Perianth white; cup orange.

Grand Monarque. Perianth white, broad; cup yellow.

Grand Soleil d'Or. Perianth rich yellow; cup deep orange.

Her Majesty. Perianth white, broad; cup orange.

Jaune Supreme. Perianth primrose; cup orange.

Lacticolor. Perianth pale lemon; cup yellow.

Louis le Grand. Perianth white; cup sulphur.

Paper White. Pure white. The earliest and most valuable for very early forcing.

Phyllis. Perianth yellow; cup orange.

Sir Isaac Newton. Perianth yellow; cup orange.

Sir Walter Scott. Perianth white; cup yellow.

Staten General. Perianth white; cup yellow.

The Scilly White. Perianth white; cup sulphur-white.

White Perfection. Perianth white; cup sulphur-white. Fine new variety.

MONSTROSITIES.

Jonquilla plenus (Double Yellow Jonquil). Flowers of a rich, full yellow, small, elegant, richly-scented.

Poeticus patellaris pleno albo cum croceo. This is the large Gardenia-flowered Double White Daffodil, seen in most gardens.

Tazetta nobilissimus. Flowers white, with yellow cup. This variety is cultivated by the Dutch.

Tazetta Romanus (Double Roman Narcissus). Flowers white, with orange cup.

NARCISSUS FLY (*Merodon clavipes*). This two-winged Fly is rather troublesome to Continental gardeners, as it feeds in Narcissus bulbs, devouring the inner parts. It is, however, too rare in England to do much harm, or to call for a long notice here. It is nearly ½in. long, rather like a hive bee in hairiness and form, but with the end of the body blunt. Its colour varies so much that several of the varieties were named and described as distinct species. The thorax is usually yellowish-brown or whitish in front, black behind; the abdomen pale at the base, brownish-yellow or rust-coloured behind. Sometimes the back is metallic-green. The eyes are hairy, and almost cover the front of the head, meeting in front in the males, but separated by a yellow stripe in the females; and there is a golden-yellow tuft of hair at the base of each antenna. The legs are black, and the last pair have the thighs thick, and each bears a tooth near the tip. The grub is like a rolling-pin in form, wrinkled, greyish-yellow, with a row of backward-directed bristles round each ring. It eats out the centres of the bulbs, and, when full-fed, crawls out, and changes into an oval brown pupa in the soil, near the top of the bulb.

Within this present year, Dr. Ritzema Bos has published, in the Archives of the Teylerian Museum, at Haarlem, an exhaustive memoir (of fifty pages, 8vo, with illustrations), upon the Narcissus Fly, under the name *Merodon equestris*. He mentions that it was introduced with bulbs from the South of Europe into Holland, where, so long as forty years since, it made itself noticeable by injuring Daffodils. It seems quite naturalised in that country, though its numbers are markedly diminished by severe winters. Besides the mechanical injury to the plants, Dr. Bos finds that the larvæ excrete an acid, which causes the decay of the tissues around the burrows, and the plants suffer much from the wound being thus extended.

Owing to the mode of life of the larvæ, it is very difficult to employ any good remedy for the extermina-

Narcissus Fly—*continued.*

tion of these insects, but they would probably yield to the methods employed against the **Onion Fly** (which *see*). Of course, sickly plants ought to be removed from among the others without delay. Dr. Bos recommends, as most successful, to keep all bulbs of Narcissus under water for eight days before planting, as this treatment, while not injuring the bulb, will kill the larvæ, which, at the usual season of planting out (August), are still near the upper part, and have not done much damage.

NARCOTIC. Producing sleep or torpor.

NARDA. A synonym of **Strychnos** (which *see*).

NARDOSMIA. Included under **Petasites** (which *see*).

NARDOSTACHYS (from *nardos*, a sweet-scented shrub, and *stachys*, a spike; the Nardus of the ancients was close akin to this plant, and not connected with the modest grass of that name). ORD. *Valerianeæ*. This genus comprises a couple of species of hardy perennial herbs, natives of the Himalayas. Corolla red or purplish; cymes at the apices of the branches or stems, scape-formed, dense, sub-capitate. Leaves entire, radical ones elongated, stem ones few. Root short, thick, fibrous, very fragrant. The species introduced is *N. Jatamansi*, which, according to Dr. Royle, is the Spikenard of the ancients.

N. Jatamansi (Jatamansi). *fl.* in dense small heads, arranged in a trichotomously-branched terminal panicle; corolla pale rose-purple, cylindric, gibbous at base, and contracted into a very short, narrow tube; lobes rounded, dorsal one larger; scape 4in. to 10in. high. September. *l.* tufted, 2in. to 4in. long, rarely longer, elliptic-lanceolate or spathulate, acute; nerves obscure, narrowed into a long or short petiole. Root fusiform, inclined, terminating upwards in a simple or forked ascending stock, 1in. to 3in. long, densely clothed with the black fibrous remains of the old petioles. 1878. (B. M. 6564.)

NARTHECIUM (from *narthekion*, a rod; in reference to the flower stems). Bog Asphodel. SYN. *Abama*. ORD. *Liliaceæ*. A small genus (four species) of hardy, herbaceous, Rush-like, marsh plants, inhabiting the temperate regions of the Northern hemisphere. Perianth of six equal, linear, membranous-herbaceous segments, which are yellow, green at back. Leaves distichous at base of stem, equitant, linear, often falcate, rigid, striated. The undermentioned species are well worth naturalising in boggy situations. Propagated by divisions of the root, or by seeds.

N. ossifragum (bone-breaking). *fl.*, raceme uninterrupted, one bract at the base, another above the middle of each partial stalk. June. *l.* rigid, strongly-ribbed, acuminate, equitant. Stem leafless, or with one or two small leaves. *h.* 6in. to 12in. Europe (Britain), North Asia, North America. It was once thought that this plant caused rot among sheep who ate it with other herbage, among which it grows, hence the ill-omened specific name. (Sy. En. B. 1542.)

N. o. americanum (American). *fl.* rather smaller, and leaves narrower, than those of the type. North America, 1811. (B. M. 1505.)

NARTHEX. This genus is now included, by Bentham and Hooker, under **Ferula** (which *see*).

N. Assafœtida (Asafœtida). *See* **Ferula Assafœtida.**

NASMYTHIA. A synonym of *Eriocaulon*.

NASONIA (from *naso*, a nose; the column and anther, together, somewhat resemble a nose). ORD. *Orchideæ*. A small genus of very dwarf-growing epiphytal cool stove Orchids, now included, by Bentham and Hooker, under *Centropetalum*. Nasonias require cool treatment, like that accorded to Masdevallias. They grow naturally at great elevations creeping amongst moss and lichens.

N. cinnabarina (cinnabar-red). A synonym of *N. punctata*.

N. punctata (dotted). *fl.*, sepals and petals bright orange-scarlet, about ½in. long; lip bright golden-yellow; pedicels slender. April. *l.* thick and fleshy, ½in. long, somewhat triquetrous. Stem erect, only 1in. or 2in. high. Peru, 1867. SYN. *N. cinnabarina*. (B. M. 5718.)

NASTURTIUM (an old Latin name used by Pliny, and by him derived from *nasus*, the nose, and *tortus*, twisted; referring to the contortions of the nose caused by the hot, acrid taste of the plants). ORD. *Cruciferæ*. A confused genus (some eighty species have been described by various authors, but probably not more than a score members of the genus are sufficiently distinct to merit specific rank) of hardy branched, glabrous or hairy herbs, of various habit, terrestrial or aquatic; they inhabit the temperate and warmer regions of the Northern hemisphere. Flowers often yellow, small, sometimes bracteate. Pod short or elongated. Leaves entire or variously-lobed, or pinnatisect. The only species that calls for mention here is *N. officinale*, for culture of which *see* **Cress, Water.** The generic name, *Nasturtium*, is frequently applied to the common forms of *Tropæolum*.

N. officinale (officinal). Water Cress. *fl.* white, small, in short racemes. June. Pods ½in. long. *l.* pinnate; leaflets three to eleven, roundish or oblong, nearly entire. Stem much branched, sometimes short and creeping, or floating in shallow water, sometimes scrambling on banks or bushes to the length of 2ft. or more. West Asia and Europe (Britain, in brooks and ditches); introduced into North America and the Colonies, and choking some of the New Zealand rivers. Hardy perennial.

NATANS. Floating under water.

NAUCLEA (from *naus*, a ship, and *kleio*, to inclose; in reference to the hull-shaped half capsule). ORD. *Rubiaceæ*. A rather large genus (about thirty species) of stove trees and shrubs, frequently very glabrous, natives of tropical Asia and Oceania. Flowers yellow, sessile, arranged in globose, compact, rarely bracteate, solitary or paniculate, often large heads. Leaves alternate, often large, sessile or petiolate; stipules rather large, intrapetiolar, deciduous. The species are of easy culture in a compost of loam, sand, and peat. Propagated by cuttings of half-ripened shoots, inserted in sandy loam, under a glass, in heat.

N. Adina (Adina). *fl.-heads* globular; corolla funnel-shaped; calyx superior, five-cleft; segments linear, thickened at the point, green; peduncles solitary, at first terminal, but, by the shooting out of a young branch from the same part, becoming afterwards axillary. *l.* opposite, on short petioles, smooth, shining, ovate-lanceolate, acuminate, with an obtuse point, quite entire, with oblique, nearly parallel veins strongly marked on the under side. Branches villous. China. An upright shrub. (B. M. 2613.) The correct name of this plant is *Adina globifera*.

N. coadunata (united-capsuled). *See* **Sarcocephalus cordatus.**

N. purpurea (purple). *fl.*, corolla purple, with spreading lobes; calyx-limb hirsute, with clavate segments; peduncles terminal, solitary, or in threes. May. *l.* petiolate, oval-oblong, acute or acuminated at both ends, smooth and shining, 4in. to 9in. long. *h.* 15ft. India, 1820. Small tree.

N. undulata (undulated). *fl.* yellow, fragrant, in large and very beautiful globular heads; peduncles drooping, terminal, solitary. May. *l.* petiolate, ovate-oblong, obtuse, undulated, shining. Branches brachiate. *h.* 20ft. Moluccas, 1820. Tree.

NAUMBERGIA THYRSIFLORA. A synonym of **Lysimachia thyrsiflora** (which *see*).

NAUPLIUS. A synonym of **Odontospermum** (which *see*).

NAUTILOCALYX. Included under **Episcia** (which *see*).

NAVARRETTIA. Included under *Gilia*.

NAVELWORT. *See* **Cotyledon Umbilicus.**

NAVELWORT, VENUS'S. *See* **Omphalodes linifolia.**

NAVENIA. A synonym of *Lacæna*.

NAVICULAR. Boat-shaped.

NEÆRA. Included under **Stenomesson** (which *see*).

NEAPOLITAN VIOLET. *See* **Viola odorata pallida plena.**

NECK. The upper tapering end in bulbs or other plants.

NECKLACE-TREE. *See* **Ormosia.**

NECKWEED. A popular name for *Cannabis sativa.*

NECTANDRA (from *nektar*, nectar, and *aner, andros*, a male (stamen); in reference to the three nectariferous barren stamens). SYN. *Porostema.* ORD. *Laurineæ.* A genus comprising about seventy species of trees, or rarely shrubs, inhabiting tropical America from Brazil and Peru as far as Mexico, the West Indies, and sub-tropical South America. Flowers axillary or terminal, pedunculate. Leaves alternate, scattered or rarely sub-opposite, coriaceous, penniveined; primary veins often, not always, more prominent than in *Ocotea.* The only species worthy of mention here is *N. Rodiæi*, the Bibisi-tree or Greenheart of British Guiana. It is a lofty tree, from 60ft. to 70ft. high, and is frequently without branches for the first 50ft. The most valuable part of the tree is its timber, which is imported in large quantities for shipbuilding purposes.

NECTAR. The sweetish secretion of various parts of blossoms, which forms the staple food of many insects, notably bees, butterflies, and moths. For the manner in which this secretion is produced, and its utility to the plant itself, *see* **Nectary.** Nectar is not, as commonly supposed, identical with honey, although, as furnished by many plants, it is the material from which bees make the latter. Analysis has shown the sugar of Nectar to be, very generally, cane sugar, while that of honey is grape sugar, consisting of dextrose and levulose, in equal proportions. The conversion of the cane sugar is brought about by an admixture of salivary secretion at the time the Nectar is sucked up. This conversion has been well made out in the case of bees; and, since larger animals and man are known to convert cane sugar into grape sugar, as an initial process in digestion, it is probable that butterflies and moths effect the same changes as the bee.

NECTARINE. The Nectarine is a form or variety of the Peach, distinguished from it in general characters only by the fruits having a smooth instead of a rough skin. For example, the same tree has, at times, produced fruit of both kinds on the same branch; and even a closer relationship has been recorded in a single fruit being half a Nectarine and half a Peach. Nectarines are, however, sufficiently distinct, in flavour and general appearance, to be constituted and considered as a separate fruit, both for dessert and for exhibition purposes.

Propagation. Nectarines and Peaches are propagated from the stones or seeds; by budding; and sometimes by grafting. The first-named method is employed for raising new varieties, and also for growing stocks whereon other sorts may be worked.

Seeds may be sown under a wall, in a warm position, in autumn, or may be stratified throughout the winter, and sown in early spring. On a small scale, or for special purposes, they may be inserted in pots at the last-named season, forwarded in a little heat, and the seedlings then planted out where they are intended to remain. As stocks, they often grow large enough for budding the first year, and, if properly treated, they may be expected to bear fruit when three years old. When seeds of either the Nectarine or Peach are sown, it is uncertain whether the product will be a form of the one or the other; consequently, named varieties cannot be perpetuated by this method.

Budding is the best and most largely-adopted plan for propagating the fruits under notice. This is practised with what is termed a "dormant" bud in July and August, or a "pushing" bud in April or May. Some shoots with buds must be retarded for use in spring, by being cut early in the season, and buried in sand, under a north wall. It is necessary that only wood-buds be selected and employed: the embryo blossom-buds are useless.

Nectarine—*continued.*

Grafting may be successfully practised in spring. The scions should be firm and short-jointed, and be taken early in the season, with a portion of two-year-old wood attached; they must be retarded until the sap in the stock begins to move. On dwarf stocks, whip-grafting may be practised; and, after the mutilated parts are fitted, and covered with clay, the latter should have earth heaped over it, to preserve a uniform moisture. If it is desired to graft standard stocks that are much larger than the small dwarf ones, the method of crown-grafting may be adopted, the grafts being inserted at any height desired.

Nectarines and Peaches may be budded or grafted on the seedling stocks of the Peach, the Almond, and the Plum. The Peach stock is insufficiently hardy, and is not much used, as, although the buds take freely, and do well for a time, the trees do not long succeed without being overtaken by a disease termed the "yellows." This is, however, much more prevalent in America than in this country. The Sweet Almond belongs to the same genus as the Nectarine and Peach, and all the varieties of the two last-named fruits succeed well on it as a stock, usually in preference to the Plum, which is, however, much more extensively employed. The Almond stocks are raised like the Peach, and may be budded when one year old. Tall standard stems may soon be grown, by keeping the plants tied upright and allowing them to grow away at will. Plum stocks are those generally used, and they answer better in various localities, on account of their hardiness. The Mussel, St. Julian, Black Damask, and White Pear Plums, amongst others, are used as stocks for Peaches. Some of them are stronger-growing than others, and varieties of fruits budded on them have similar peculiarities. By many of the French growers, the Black Damask is preferred; and this, with the St. Julian, Mussel, and White Pear, may be considered the best.

Situation and Soil. The climate of this country will not admit of the Nectarine and Peach being cultivated in the open ground; except in the most favoured localities, a wall with south aspect, or even glass protection, becomes a necessity. The trees may possibly live, and make some growth; but, for fruit production, it is all-important that the wood annually made should also be thoroughly ripened in autumn. Some protection against the evil influences of frost and cold easterly winds on the early-expanding blossoms, is also necessary, in spring, and this is most readily applied over trees on walls. In the warmest parts of the country, where the situation is not too much exposed to wind, or, on the other hand, to cold fogs in spring, Peach or Nectarine-trees may be planted against walls with an east or a west aspect; but a situation fully exposed to the south is that which is necessary in the majority of cases. In the general arrangement of kitchen gardens, the principal walls should be built so as to receive as much sunshine as possible, and the very best position has usually to be accorded the fruits under notice. The special preparation of fruit borders throughout entails considerable labour at first; but the results generally repay the trouble, both by the better success attending the trees planted therein, and also the important crops continually succeeding each other in the cultivated part farthest from the wall. Fruit borders, to be of use for other crops should not be less than 12ft. wide, as nothing should be planted, nor even the ground kept dug, within 3ft. of the wall, supposing the trees are there. A soil enriched with manure is not desirable, as it tends to produce an undue, sappy growth, which lacks blossom buds, and, moreover, does not become ripened. An open, loamy soil is the most appropriate, not too light, on account of being easily dried up, nor, on the other hand, composed of stiff clay: the trees cannot

Nectarine *continued.*

possibly succeed in this latter. Good drainage is all-important; it must be provided artificially, if the subsoil will not conduct water away readily. When necessary, this can best be accomplished by placing a drain, with a proper outlet, parallel with the wall, and near the outside edge of the border. It should be deep enough to take all superfluous water—say, 3½ft. from the surface—otherwise, the trees will not thrive. About 3ft. depth of soil, of a fairly good description, should be provided, and it is advisable that the border should incline from the wall, thus allowing the part where the trees are planted to be the highest and, consequently, most efficiently drained. Old borders are not suitable for planting Nectarine or Peach-trees in without the addition of some new soil around the roots. Where other conditions are favourable, sufficient might be placed round each tree to give it a good start, and more could be added afterwards, if it were required. A compost of loam and manure, mixed with the natural soil of the border, will always greatly improve it, and do more good to fruit-trees than manure alone. Charred rubbish, old crushed mortar and brick, or burnt clay, should be freely intermixed where soils are inclined to be adhesive; but they are much better not to be of this description, if it can be avoided. The chief points requisite under this heading are, therefore: a favourable position against a south wall for planting; a good depth of soil; and efficient drainage, secured either by natural or by artificial means. Without these provisions, Nectarines and Peaches will rarely succeed satisfactorily.

Planting and After-treatment. The autumn is, undoubtedly, the best season for planting, as, in spring, root-action and vegetation take place early in the trees, and they cannot be removed at that season without receiving more or less check. As early as convenient, after the leaves drop, is, perhaps, the most desirable time for planting. All the roots should be carefully laid out at full length in a hole of sufficient size for their reception, and, after a little fine soil has been shaken amongst them, the remaining space should be filled with a prepared compost, as already recommended. About 6in. of space should be allowed between the wall and the tree, and the roots should not be placed at a greater depth than that to which they have previously been subjected. It is advisable to cover the surface with stable litter, so far as the roots extend, and not to secure the branches, except very loosely, until all the new soil has properly subsided. More than ordinary attention will be necessary in watering, mulching, &c., for the first season, or, at least, until the effects of transplanting are over, and the ordinary growth is resumed. Passing on to trees that are established, and in bearing condition, reference may be made to the protection which the blossoms require in spring. Gardeners not unfrequently err in applying too thick a covering, or in keeping it over the trees in mild weather, when it would be better away. Cold storms and easterly winds are most to be guarded against; frost oftentimes does not cause so much injury, unless the flowers become actually frozen, and bright sunshine appears on them while in this state. Movable coping boards, about 18in. wide, should be fixed on brackets near the top of the wall during the time the trees are flowering, and removed about the end of May. From the edge of these boards, ordinary nets of double or treble thicknesses, frigi-domo, tiffany, or whatever may be at command, may hang down. If any substance is used which excludes light, it will be necessary to remove it on all favourable occasions. In May, or about the beginning of June, syringing may be practised daily, preferably with the garden engine. It will, at times, be necessary to thin the fruits; but, as a rule, the crops of Nectarines and Peaches which set on trees outside are not much greater than what healthy

Nectarine *continued.*

trees should be expected to ripen. Caution must, at any rate, be exercised in thinning only those parts where the fruits are unduly thick, or where they are unevenly distributed over the surface of the tree. Untoward circumstances may cause a large number of fruits to drop off before the stoning period is past; in fact, a greater or less proportion invariably do so, on trees both indoors and out. Fan-trained Peach and Nectarine-trees that are intended to be permanent should be planted at from 16ft. to 20ft. apart. If a standard and a dwarf are planted alternately, they may be closer to each other than the distance named; or others may be put in between temporarily, with a view to removing them afterwards.

Pruning and Training. Pruning Peach and Nectarine-trees is work which requires frequent attention; not only in winter, when the leaves are off, but also throughout the summer. It should be practised only by persons who understand the habit of the tree on which they are to operate, and, above all, its mode of bearing. The fruits each season are borne principally on wood made the previous year; they are also sometimes produced from short side shoots or spurs, which are, as a rule, well

FIG. 656. NECTARINE AND PEACH. Ripened Spur Branch, showing (*a, a*) Wood-buds and (*b, b, b*) Blossom-buds.

furnished with blossom-buds (see Fig. 656). The chief aim in pruning should be, therefore, to annually introduce as much young wood as space will admit, without any part being unduly crowded, or detriment caused to the crop of the current year, and, in the winter pruning, to cut the old fruit-bearing wood away, and allow the new wood to take its place. Medium-sized, short-jointed wood is always most satisfactory; and this can only be obtained by allowing sufficient space for the development of the young shoots under a full exposure to sun and light. Buds are formed at each node as growth proceeds, either singly or in twos or threes (see Fig. 657). They are very differently constituted, and are termed respectively wood-buds and fruit or blossom-buds. The former are thinner and more elongated than the latter, and contain a growing point, surrounded with leaves in a rudimentary state. Fruit-buds contain rudimentary blossoms only, and, in pruning, no shoot should be cut back to a node where these only are present, as it would eventually die back to a wood-bud, whence a new shoot might proceed. Young trees are, as rule, naturally inclined to the production of a preponderance of wood-buds; while, in older-established specimens, fruit-buds usually predominate. In the training of Nectarine and Peach-trees on the fan system, it is important that the head should be evenly balanced by the branches on either side of the centre stem from the very earliest stages; otherwise, the tree will always be irregular, the stronger branches will rob the weaker ones, and the upper part, whence the sap most readily flows, will soon succeed in rendering the lower branches weak and unsatisfactory for fruit-bearing. A maiden tree consists of a single shoot,

Nectarine—*continued.*

which grows from the bud the first season. When intended for fan training, it is planted either against a wall or in the open ground, as in nurseries, where temporary stakes are inserted, on which to eventually train the branches. In the autumn, it should be cut hard back to within about three eyes of the place where the bud was inserted. Shoots from two of these eyes should be encouraged to grow, one on either side of the stem, and, if they succeed with equal vigour, the other will not be required. The flow of sap may be checked eventually, should there be a tendency on the part of one leading branch to grow stronger than another, by merely bending the point down, or bringing it into a more horizontal direction. At the same time, the weaker one should be brought more upright, and an opposite effect will be the result. Other shoots, which are intended to form leading branches, will, in due course, be obtained from the base of those already referred to,

FIG. 657. NECTARINE AND PEACH. Branch of Ripened Wood, showing (A) Single, (B) Double, and (C) Triple Buds. *a*, *a*, *a* represent Wood-buds; *b*, *b*, *b*, Blossom-buds.

and these should also be disposed so as to balance the head as evenly as possible. The centres of young trees should be kept clear; it is never difficult to get them filled at almost any time, when the branches that are required to be at an angle are properly established. A central shoot, allowed to grow upright, would, in any case, be certain to grow too stong. Winter pruning of Peach and Nectarine-trees may be practised, in favourable weather, at any time when the leaves are off, but before the buds expand in spring, and training may follow immediately after. The leading branches should first be placed in position, and secured, the subsidiary ones being arranged afterwards. Experienced cultivators remove weak and misplaced branches at almost any season, when it is seen they are not likely to be of use for fruit-bearing, and train new and better shoots to take the places of those removed. This

Nectarine—*continued.*

may be practised more especially so soon as it is certain the fruits are set, and the strongest and best-placed ones can be selected for bearing. Disbudding is annually of great importance in Peach and Nectarine culture, the number of new shoots which appear in spring being tenfold more than can be accommodated with space. A further reference will be made to this when treating of trees grown under glass.

Cordon training possesses advantages in many respects over the fan method, as it is much easier of accomplishment, a wall may be covered in a much shorter time, and a larger number of trees, and, consequently, of distinct varieties, may be planted in a given space. Single cordons, trained in an oblique direction, represent the system usually practised in this style with the Peach and Nectarine; they may be planted as near as 2ft. apart. Maiden trees, if well ripened, need not be cut back very much, if they are furnished with lateral side shoots throughout, and a good wood-bud is present for shortening to. These laterals should be regulated as equally as possible, on either side of the leader, and be nailed in: the leader must be specially attended to, until its limit is reached. It should, meanwhile, be pinched once or twice during the season, so as to encourage plenty of side shoots, any of which, if not required, may have their points pinched out. All the wood made by established trees on the cordon system, should be intended for fruit-bearing; and, if new shoots are encouraged from the base of the laterals each year, and receive proper attention, by exposure to light, and stopping them from the top of the tree downwards, as they reach their limit, nearly all the old laterals may be taken off, after the fruit is gathered, immediately above the place whence the new ones proceed.

The foregoing are somewhat general remarks respecting the pruning and training of Peach and Nectarine-trees—work which is amongst the most important in gardening operations, and which, moreover, the most lengthy and minute details in books would but imperfectly teach. There are few subjects amongst fruit-trees that require such frequent and timely attention, especially under glass; and, if cultural success would be attained, these operations must be conducted only by persons who are fully acquainted with what is conducive to that end, and are capable of exercising forethought and discretion, which, in this case, must be the outcome of personal experience in performing or assisting with the work.

Cultivation under Glass. There are few gardens where fruit-trees of any description are forced, and the Peach and Nectarine not included. Next to the Vine, their fruits are, in general, the most important; and, if forcing is not resorted to, the trees ripen crops under glass at any season that are far superior to those secured from outside. In the northerly and unfavourable parts of the country, too, glass protection becomes a necessity in order to get fruits to ripen at all. This is sometimes provided in the shape of what are termed glass cases. They consist of upright sashes placed at a sufficient distance only from wall trees to allow of the latter being attended to. The sashes are sometimes made movable, by being placed on rollers at the base, and the portion of roof which connects their tops with the wall should be provided with ventilators. Trees grown under glass are usually trained to a wire trellis—represented by the dotted line in Fig. 658—either fixed or movable, and situated about a foot from the roof. They are also sometimes trained to the back wall; and a combination of both systems may be practised, by limiting the top growth of those at the front part of the house, and planting trees with tall stems at the back. Peach and Nectarine-trees lift readily in autumn, even when of large size, if care is taken in the operation; consequently, it is a good plan

Nectarine—*continued.*

to prepare them elsewhere, and transplant into permanent positions when they are nearly or quite ready for fruit-bearing. It will be necessary to prepare a border inside the house—at least, for those intended to be forced; the roots are also far more under control when thus restricted at all seasons. Efficient drainage must be provided, and a depth of about 2½ft. of soil is recommended. This should be a prepared compost of fairly good loam, some crushed ½in. bones, and plenty of mortar rubbish, well intermixed. The borders should never be allowed to get dry, but, of course, more water will be required at different seasons, according to the various stages in which the fruits may be. Many of the tenderer varieties of mid-season and late Peaches and Nectarines only succeed satisfactorily under glass protection, and all the best are well worthy of it. A Peach-house in which forcing is to be conducted is best constructed as a lean-to, and the roof should preferably be of a steep pitch, and either carried down low at the front, as shown in Fig. 659—a style that would also answer for constructing as a glass case over trees on

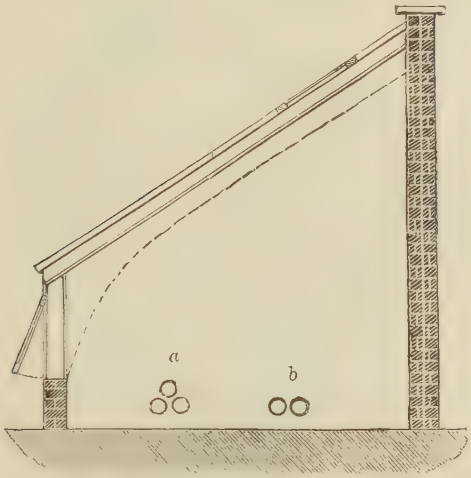


FIG. 658. SECTION OF LEAN-TO PEACH-HOUSE, showing Position for (*a*) three 3in. and (*b*) two 4in. Hot-water Pipes.

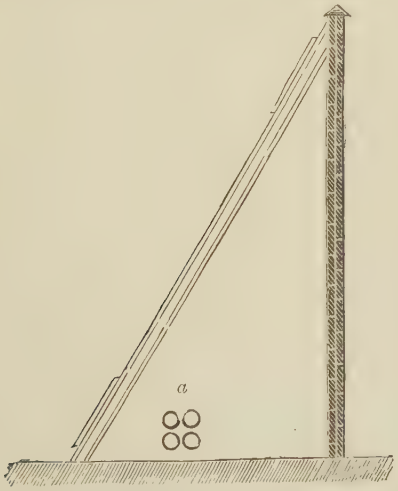


FIG. 659. SECTION OF HOUSE OR GLASS CASE FOR COVERING PEACH AND NECTARINE TREES ON WALLS, showing (*a*) Position for four 3in. Hot-water Pipes.

Nectarine—*continued.*

walls—or be provided with front sashes for the admission of light (see Fig. 658). It should, at any rate, be provided with some method of free ventilation, and, if possible, the roof-sashes made movable, in order that the trees may be subjected to full exposure each year after their fruits are gathered. Fan-trained trees, on dwarf, and also on tall, "rider" stocks, are the shapes most favoured for indoor culture. Cordons are well suited for planting in houses intended for mid-season and late supplies, as an opportunity is thus given of including many fine varieties in a limited space, and excellent fruits are also invariably obtained under this system of training. Sorts thoroughly adapted for forcing are far from numerous; consequently, it is not advisable to rely on any that have not been thoroughly proved. Elruge is, perhaps, the best of all Nectarines for early forcing; it seldom fails in producing a crop, if proper treatment is given. Supposing a good tree of this, and another of an Early Grosse Mignonne Peach, were planted in an early house (these varieties succeed admirably together for the purpose), the Nectarine should be accorded the warmer end, if there is a difference, as it will always bear more heat than the Peach. Standard Peach-trees are sometimes grown in orchard-houses, in pots, and also planted in the borders. This style of training is, however, not much favoured by cultivators, and is not here recommended, on account of such a number of fruits being shaded with foliage, and consequently but imperfectly ripened, and of poor quality in comparison with others fully exposed to sun and air during the whole of the time they are swelling and ripening.

The habit assumed by trees bearing stone-fruits—of which the Nectarine and Peach are important examples—may be briefly referred to, as it is by no means well understood. The terms, too, in use respecting various stages through which the fruits pass, have but little significance, unless the meaning of each be explained. So soon as the flowering stage is over, and the fruits are set, what is termed the first swelling begins. After a time, stoning, or the formation of the kernel in the fruit, commences; and, during this process, the latter remains stationary, so far as enlargement is concerned. When stoning is completed, the fruit swells, and, in due course, ripens off. These several stages are termed respectively the flowering, first swelling, stoning, second swelling, and ripening, periods. The seasons for giving assistance to the trees, either by adding a top-dressing of manure over the border, or by an application of liquid manure water to the roots, are naturally those when the fruits are swelling, as, at such periods, a larger amount of nourishment is requisite, and the effect is more marked, than at other times.

Forcing. For obtaining early Peaches and Nectarines, forcing operations may be commenced in November, or early in December. The trees should have been previously well ripened, pruned, and properly tied in position to the trellis, or nailed to the wall, as the case may be; and the house, sashes, &c., should also have been thoroughly cleaned. A mere closing of the ventilators will be sufficient for the first few days, as no trees are more sensitive to heat; and from this arises a danger of the blossoms dropping prematurely. A temperature of 40deg. to 45deg. by night, with a little air and a rise of 5deg. by day, is quite high enough at first; and, if this can be maintained until the flowers expand, by employing a heap of fermenting material, instead of fire heat, it will be far preferable. In any case, fire heat must only be very cautiously applied, until after the fruits are set, as much more harm is to be apprehended from a high, than from a comparatively low temperature, provided this latter does not reach the freezing point. As the flowers expand, a circula-

Nectarine—*continued.*

tion of air, and a drier atmosphere, must be maintained; exposure to the full sun and light must also in no way be hindered. To assist in, and insure, the fertilisation of flowers on early forced trees, many cultivators use a camel's hair brush on each, or a rabbit's tail, lightly drawn over them all, answers equally well. This operation should only be performed when the pollen is quite dry.

So soon as the fruits are set, a heavy syringing with tepid water should be given, to dislodge the fading blossoms; and daily syringings may also be practised from this time onwards. Gradually raise the minimum night temperature to 50deg., and the day to about 65deg., or even higher, by sun heat, and maintain this steadily until the stoning period is over, or the raising of the mean temperature outside, by sun heat, suggests a similar rise under glass. Light and air should be freely admitted during warm weather, in spring, and also when the fruits are ripening; but airing must be cautiously managed during the prevalence of easterly or other cold winds. A good watering will be necessary at starting time, especially if the sashes are not movable so as to admit the early autumn rains. After flowering is past, it should be practised as circumstances require in different cases, at intervals of, say, three weeks or a month. A thorough soaking should be given when watering becomes necessary: the application of only a few canfuls will always prove misleading, in making the surface appear wet, while the roots underneath may possibly be in a much drier medium than that which is desirable. If the roots of early-forced Peach and Nectarine-trees are entirely in outside borders—an arrangement not recommended—they will usually be wet enough from rain—at least, up till the time of the second swelling of the fruit. A thick covering of litter should be kept on the surface of such borders, and also on those partially outside, from starting time until about May, when it should be removed, part at a time.

Thinning the Fruit. Nectarine and Peach-trees in a healthy state, and under proper management seldom fail to set far more fruits than it is desirable should be allowed to remain on them, as not only would the crop be composed of inferior produce, both in size and quality, but the trees would soon become exhausted; the fruits would also drop off in large quantities during the stoning period. So soon as they are about the size of marbles, thinning of such as are underneath, also others off weak shoots, and where they are too thickly placed, should be commenced, and the operation many times repeated at intervals, rather than reduce too severely at once. The fruits finally left should be those as evenly distributed over the tree's surface as circumstances admit. A few frequently fail in stoning, even on healthy trees, and allowance must be made for such; but not to too great an extent, or the evil would be thereby encouraged. An average of one fruit to a square foot of the surface covered by the tree is sometimes recommended; but established healthy trees will bear a much heavier crop than this, if they are fed at the roots when the fruits are swelling. It is not unusual for a good large tree to ripen from twenty to thirty dozens of excellent fruits, not only in one year, but in many. To do this, however, it must be well cared for in every respect, particularly in the thinning, training, and thorough ripening of the wood.

Disbudding. This operation must, of necessity, be largely practised on Peach and Nectarine-trees, as they produce such an enormous quantity of shoots, for which it would be impossible to find space. As before remarked, the fruits are chiefly borne on wood made the previous year, and a supply has annually to be laid in all over the tree for the special purpose of fruit-bearing,

Nectarine—*continued.*

and with a view to afterwards cutting it away, except when required for permanent branches for enlarging the tree. Fruits may also be allowed on the small side shoots or spurs, which should be stopped for their encouragement when enough leaves are formed beyond to cause a free

FIG. 660. FRUITING BRANCH OF NECTARINE, showing Method of Stopping to assist the Development of the Fruit.

circulation of sap (see Fig. 660). Disbudding has for its object the removal of all superfluous shoots at an early stage, retaining the best-placed ones for forming the new wood, and pinching the remainder, to encourage the enlargement of the fruit. It should be performed by degrees, rather than remove a quantity of foliage at one time, and so cause a check to the trees by obstructing the flow of sap. If a good shoot can be obtained from the base of that of the previous year, it should have preference, and be encouraged; the latter (if there is a fruit on it) may have the remaining shoots pinched for the season until the fruit is ripe; it may then be cut away, and the new one take its place. Overcrowding must specially be prevented, by disbudding and pruning; otherwise, neither the wood nor fruits can get sufficient sun and light to ripen them. A few leaves should be drawn aside for allowing a full exposure of each fruit to the sun, when the second swelling begins; and, when ripening, a net, hung loosely to the trellis, underneath the tree, is a good plan for preventing any fruits from falling and becoming bruised.

Diseases, Insects, &c. In America, much more than in this country, a disease called the "yellows" attacks Peach and Nectarine-trees. It is most prevalent amongst trees worked on the Peach stock, and the almost exclusive use of the Plum and Almond is, consequently, the best preventive. The leaves turn yellow, gradually become smaller, and eventually the tree dies. Gumming is much to be dreaded, as, in bad cases, there is little chance of a cure. *See* **Gummosis.** It is greatly encouraged by an over-rich soil. Blistered leaves are chiefly caused by draughts, cold winds, or too much exposure of the young and tender foliage. Mildew is sometimes destructive to the growing points; the immediate application of flowers of sulphur is the best remedy. Any sorts of Aphis may be destroyed by fumigation; and Red Spider and Thrips, great enemies in Peach and Nectarine cultiva-

Nectarine—*continued.*

tion, are best kept down by a frequent use of the syringe, or, better still, the garden engine, and by the damping of the soil, more especially near hot-water pipes. Earwigs and Ants are at times most destructive to ripe fruits; the former may be trapped in hollow pieces of beanstalk, placed amongst the branches, and the Ants may be greatly reduced by frequently disturbing their nests, and pouring water or dusting a little soot amongst them. *See also* **Peach.**

Sorts. Nectarines and Peaches cannot, as a rule, be properly distinguished by the appearance and flavour of the fruit alone; consequently, other characteristics, observable in the different varieties, are adopted by pomologists, to form classes into which the whole number may, according to their several distinctions, be placed. The chief characters on which the classes are founded are: (1) the size of the flowers; (2) the fact of the fruit having a melting flesh, and parting freely from the stone, or a firm flesh which adheres to the stone; (3) the absence or presence of glands at the base of the leaf, or on the petiole (their shape being given in the latter case), and on the leaves being either serrated or crenated. Varieties with free, melting flesh, are termed Freestone, and those with firm flesh are classed as Clingstone. The former are far more numerous than, and superior to, the latter, which, in consequence, are not much cultivated. An entire fruit, and also a section with the stone left intact, of a Clingstone

FIG. 661. CLINGSTONE NECTARINE.

Nectarine, are represented in Fig. 661. The flesh adheres to the stone by the stringy-like substance shown in the illustration. It is also similar in fruits of Clingstone Peaches. The different shapes of glands, and the size of the flowers, termed respectively "large" and "small," are, at times, so near alike as only to be with difficulty distinguished from each other. The following is a selection of the best and most esteemed Nectarines, all of them belonging to the Freestone class.

Albert. Flowers large. Fruit very large, roundish, ripening early in September; flesh yellow, pale red near the stone, of excellent flavour; skin greenish-white, pale red next the sun. Leaves crenate, with kidney-shaped glands. A fine variety, requiring a warm position, or glass protection.

Albert Victor. Flowers small. Fruit large, flattened at the crown, and mottled with red next the sun, ripening outside about the middle of September; flesh juicy, and of brisk flavour, very red near the stone. Glands round.

Balgowan. Flowers small. Fruit very large, broadest at the base, dark red next the sun, pale green, mottled with dull red on the shaded side, ripening at the beginning of September; flesh rich and melting. Leaves crenate; glands kidney-shaped. A remarkably vigorous and hardy variety.

Byron. Flowers very large. Fruit large, roundish, rich orange-yellow, mottled crimson, tender, and richly flavoured, ripening outside from the middle to the latter end of September. Leaves with kidney-shaped glands.

Downton. Flowers small. Fruit large, roundish-oval, deep red on the exposed side, ripening in August and early in September; flesh pale green, melting, juicy, and rich. Leaves crenate; glands kidney-shaped. A vigorous-growing and good bearing variety.

Elruge. Flowers small. Fruit of medium size, roundish or somewhat oval, dark violet-red next the sun, pale green in the shade,

Nectarine—*continued.*

covered with small brownish specks, ripens outside in August and at the beginning of September; flesh whitish, melting, and of the highest class flavour. Glands kidney-shaped. One of the best Nectarines in cultivation. It is an abundant bearer, and, perhaps, the best of all for forcing. STANWICK ELRUGE is a large Nectarine, of excellent flavour, raised from Elruge and Stanwick. The fruits are exactly like those of the last-named parent, and are ripe about the same time, or a little earlier, than Elruge.

Hardwicke. Flowers large. Fruit very large, nearly round, dark purplish-red next the sun, ripening in August; flesh greenish, with reddish tinge next the stone, of excellent flavour. Leaves serrated, without glands. A hardy, free-bearing variety.

Humboldt. Flowers large. Fruit large, with pointed apex, bright orange-yellow, streaked and mottled with crimson on the exposed side, ripening at the latter part of August; flesh orange colour, tender, and richly flavoured. Glands round. A fine free-bearing variety of the Orange Nectarines.

Hunt's Tawny. Flowers small. Fruit medium, or rather small, pale orange, deeply coloured next the sun, marked with small russety specks, ripening about the middle of August; flesh deep yellow or orange, red next the stone, melting and juicy. Leaves serrated, glandless. A useful early variety, of hardy constitution.

Lord Napier. Flowers large. Fruit very large, ovate, depressed at the apex, of a deep very dark crimson colour on every part exposed, ripening outside early in August; flesh white, tender, and of a rich and excellent flavour. Glands kidney-shaped. This is one of the largest and best, and, withal, the earliest variety of Nectarine. It was raised by Mr. Rivers, of Sawbridgeworth.

Newton. Flowers small. Fruit large, bright red or greenish-yellow, mottled according to exposure, ripening in September; flesh nearly white, richly flavoured. Glands kidney-shaped. A handsome variety.

Pitmaston Orange. Flowers large. Fruit large, terminating at the apex in a small swollen point or nipple, deep orange, purplish-red next the sun, streaked, ripening at the end of August and in September; flesh deep yellow or orange, juicy and rich. Leaves crenated; glands round. The tree is free-bearing and hardy. PINEAPPLE is an excellent and improved variety, with a much richer flavour, ripening early in September; it was raised from Pitmaston Orange by Mr. Rivers, and is one of the best Nectarines grown.

Prince of Wales. Flowers small. Fruit very large, greenish-yellow, deep red on the exposed side, ripening in the middle or latter part of September; flesh whitish, red next the stone, melting, and of rich flavour. Glands round. A fine, rather late variety, requiring a warm situation.

Rivers's White. Flowers large. Fruit large, roundish, nearly white, covered with a fine bloom, ripening at the end of August; flesh white, of excellent flavour. Leaves crenate; glands kidney-shaped. Raised by Mr. Rivers from the old White Nectarine, which it still resembles somewhat.

Spencer. Flowers large. Fruit large, flattened, dark crimson all over, deeper on the exposed side, ripening about the middle of September; flesh stained with red almost throughout, melting, and richly flavoured. Glands round.

Stanwick. Flowers large. Fruit large, roundish-oval, pale green, purplish-red where exposed, ripening in the middle and latter part of September; flesh white, tender, juicy, and rich. Leaves crenated; glands kidney-shaped. The stone has a sweet kernel like that of a nut. A fine variety. The tree does not succeed well, except under glass protection.

Victoria. Flowers small. Fruit similar in flavour, and in several other respects, to the Stanwick, but the kernels are bitter; it ripens about the end of August, nearly a month earlier than Stanwick, and does not crack like that variety. Leaves crenate; glands kidney-shaped. A valuable Nectarine, and one of the best. Raised by Mr. Rivers.

Violette Hâtive. Flowers small. Fruit large, roundish, dark purplish-red, marked with pale brown spots next the sun; flesh whitish, deep red near the stone, melting, juicy, and rich, ripening outside at the end of August and early in September. Leaves crenate; glands kidney-shaped. One of the very best varieties, either for forcing or outside culture. It has numerous synonyms, including Aromatic, Brugnon Hâtif, Early Violet, Hampton Court, Lord Selsey's Elruge, Violet Musquée, &c.

NECTAROBOTHRIUM. A synonym of **Lloydia** (which *see*).

NECTAROSCORDUM (from *nektar*, nectar, and *Skorodon*, Garlic; referring to honey pores in the flower). ORD. *Liliaceæ*. A monotypic genus, now included, by Bentham and Hooker, under **Allium** (which *see* for culture of the species).

N. siculum (Sicilian). *fl.* green and purplish, in a loose umbel, on drooping pedicels; perianth somewhat bell-shaped; scape 1ft. to 3ft. high. June. *l.* linear-lanceolate, channelled. Sicily, 1832. (B. R. 1912.)

NECTARY. A term that has been used in a somewhat vague way either (1) to denote any appendage in a flower that does not belong to one of the series of parts recognised by botanists as forming ordinary flowers (*e.g.*, the glands in front of the petals in *Parnassia palustris*), without reference to their function and use to the plant, or (2) to indicate that the part so named produces a sweet fluid (*see* **Nectar**), which is retained in the cells on its surface, or soaks out through the walls of the cells or through the stomata (*see* **Stoma**), which many of the Nectaries possess in their surface layer of cells. The word is now almost restricted to this latter use, and is employed to denote simply the nectariferous character of the part, whatever may be its structure, and whatever the nature of the part of which it is a modification.

The relation of the sugary secretions to growth is discussed below, and from this relation it must evidently be present frequently in growing tissues. Flowers present conditions that render rapid growth a necessity at certain times, inasmuch as, just before opening, the various parts of the flower increase much in size, and, after fertilisation, the fruits and seeds usually take on rapid growth. Hence, Nectar may be expected to be largely present in flowers. The many careful observations that have been made of late years by botanists in various countries have shown, among other interesting facts connected with the existence of Nectar in plants, that sugar is present in considerable amount in the tissues of many flowers in which there is no trace of Nectar on any part of the surface; and, also, that Nectaries are frequently present on vegetative organs of plants, *e.g.*, on stipules of Beans, on the small glandular swellings on the leaf-stalks of species of *Prunus*, and of the Castor-oil plant, and on the secondary leafstalks of various ferns. Since, then, there is a tendency to produce sugar in the flowers, and since the Nectar containing the sugar tends, like other fluids, to soak through the cell-walls, and to appear on the outer surface of the part in which it exists, we can perceive that insects would probably be induced to visit the flowers to collect the Nectar, just as bees visit the stipules of Beans for this purpose. But, in visiting the flowers, the insects are apt to transfer pollen from the anthers of one flower to the stigma of the next of the same kind visited by them, and they thus aid in securing cross-fertilisation; a result which experiments show to be productive, in many plants, of more numerous seeds, and healthier and stronger seedlings, than follow self-fertilisation. It is thus an advantage to such plants to have frequent insect-visitors at their flowers. In many unisexual flowers, the seeds could not be fertilised in the absence of insects, since they produce pollen unsuited for conveyance by the wind to the stigma of the male flowers. Thus, the presence of Nectar is advantageous to both flowers and insects; and there seems good reason to believe that the habit, in insects, of visiting flowers for Nectar, has brought about, in a great degree, the vast diversities of structure and form in both flowers and flower-frequenting insects. It is necessary for the well-being of the plant that the Nectar shall be so placed as to insure that any insect able to reach it shall transfer pollen from the ripe anthers of one flower to the ripe stigma of a flower (usually older) subsequently visited. Hence arise most of the irregularities and peculiarities in the form and in the position of the various parts of flowers; some to insure the access of the suitable insects by the right path, and others to prevent the access of visitors that would remove the Nectar without effecting pollination in repayment of the benefit.

The position of the Nectary or Nectaries in flowers, and the organs of which they are modifications, differ with the kinds of insects for which they are suited: some

Nectary—*continued.*

lie almost on the surface of the flower, *e.g.*, in Carrot, Elder, Ivy, &c.; but most are situated in the deeper recesses of the flowers. The position of Nectaries is also affected by the fact that exposure to water, in the form of rain or dew, injures the Nectar, and renders it unsuited for attracting insect visitors. Hence, the Nectaries have to be protected against this danger also.

From the fact that sugar is present in all growing structures of flowers, and that it is most abundant in the receptacle, in the neighbourhood of the ovary, we should expect to find the Nectaries very generally developed in this region; and such is very often the case. The chief structures that may be modified to form Nectaries are the following: The receptacle often produces Nectar, either over the whole surface (where not occupied by parts of the flower), as in Marsh Marigold (*Caltha palustris*), or on special outgrowths, forming what is sometimes called the disk; and this latter may form a complete ring between any two successive series of parts, *e.g.*, in the Maples; or may be broken into portions surrounding the bases of particular organs, *e.g.*, in cruciferous plants, round the bases of the short stamens. Any of the organs of the flower may be modified to form Nectaries in different plants.

In Poplars, the stigma acts as a Nectary; in *Umbelliferæ*, and in many other plants, the Nectary is closely adherent to the base of the style; in many *Solanaceæ*, it is at the base of the carpels. The stamens may abort, and may be changed into Nectaries, *e.g.*, in *Scrophularia*, &c., or they may bear nectariferous spurs, as in *Viola* (see below), or outgrowths from the filament, or from some point of the connective. On the petals and sepals they often appear, usually as small pits on the inner surface, *e.g.*, in *Fritillaria*, either uncovered, or, as in some species of Buttercups, covered with a small flat scale, behind which the Nectar is formed. In a good many plants, the petals (and less often the sepals) are tubular or spurred, as in Columbine, Hellebore, Aconite, &c., and the inner end of the organ is the Nectary; but in some (*e.g.*, Violet) the spur merely serves to receive the Nectar. In *Viola*, one of the petals is thus extended

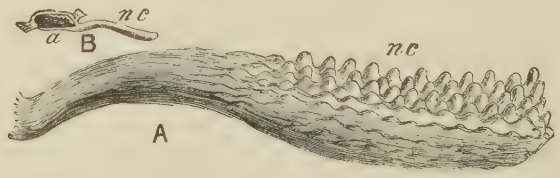


FIG. 662. ANTHER CELLS AND PROCESS OF VIOLA TRICOLOR. A, Process of Anther running into spur of *Viola tricolor*, much magnified—*n c*, Nectar Cells, somewhat exaggerated. B, Anther and Process as removed from flower—*a*, Anther Cells; *n c*, Nectar Cells.

backwards, and curious appendages (*n c*, B, Fig. 662) on two anthers pass into the cavity provided, and there secrete a sweetish fluid. Perhaps no flower presents equal advantages with this to the microscopic tyro who would study Nectar cells; for not only are these large (*n c*, A, Fig. 662), but they lie on the outside of the process (their protection being derived from the covering afforded by the spur-like petal previously mentioned), and, consequently, the difficulties of section cutting are, in their case, altogether avoided. Much has been written upon the nature of Nectaries in the leading European languages; but even the enumeration of the principal works would exceed our space, and we shall content ourselves with naming the following books written in English or translated from German, which are replete with information on the mutual actions of the plants and insects: H. Müller's "Fertilisation of Flowers by Insects" (Clarendon Press, Oxford); Lubbock's "British

Nectary—*continued.*

Wild-flowers in their Relation to Insects"; Kerner's "Flowers and their Unbidden Guests"; Darwin's "Cross and Self Fertilisation of Plants," and various papers by Rev. G. Henslow and others in the publications of the Linnean Society, in the "Popular Science Review," and elsewhere.

In regard to the microscopic structure of the Nectary, the nectar-producing tissue is usually made up of small thin-walled cells that contain abundant protoplasm, a nucleus, and cell-sap, rich in sugar. As a rule, the Nectary shows a number of pores or stomata in the surface layer of cells, and through these the Nectar is poured on to the surface of the organ, whence it is sucked up by the visitors to the flowers. There is usually only a thin cuticle, or it is even absent practically in some plants, over Nectaries; and frequently, the Nectar soaks out through the thin walls of the cells to the surface; but it may be retained inside the surface layer, in cells so thin walled as to be easily pierced by the proboscis of the insects suited to convey pollen to the stigma.

The Nectary has also been microscopically studied by Mr. Cheshire, some of whose results and illustrations (engraved from his own drawings on the wood), as given in "Bees and Bee-Keeping, Scientific and Practical," are here, by permission, introduced. Taking a recently-expanded blossom of the common scarlet Pelargonium of gardens, which is selected because it is at command, in most places, and at every season of the year, we find, running down the flower stalk, and immediately under the uppermost and broadest sepal, an enlargement of the stalk itself, marked off by inconspicuous grooves, and terminating in a small bulbous expansion a little

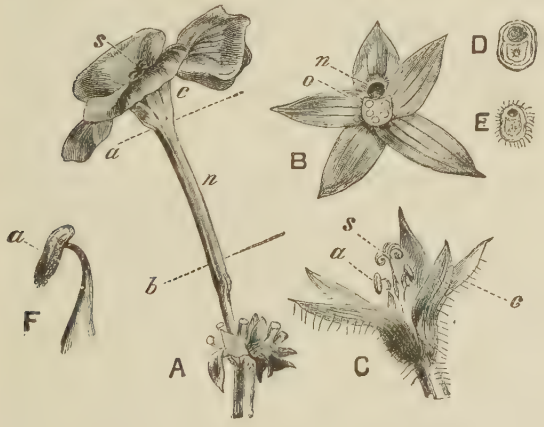


FIG. 663. PELARGONIUM BLOSSOM AND NECTARY.

A, Pelargonium Blossom—*s*, Stigmas; *c*, Calyx; *n*, Nectary. B, Calyx, with Ovary in cross section—*n*, Nectary; *o*, Ovary. C, Blossom, side view, Corolla removed—*s*, Stigmas; *a*, Anther; *c*, Calyx. D and E, Cross Sections of Ovary, through lines *a* and *b* of A. F, Stamen—*a*, Anther.

below the line *b*, Fig. 663, and which is often purplish in colour. This is the Nectary; and, if we now remove the petals, and look at the calyx from the front, we shall see into its opening (*n*, B). Making cross sections through the lines *a* and *b*, we find the Nectary wider above, as at D, and narrow below, as at E. A keen razor, dipped in methylated spirit, will take off slices sufficiently thin for microscopic examination under a cover glass in water. Cutting D longitudinally, so that the Nectary is divided, and then removing a thin slice from that which forms the upper part of the figure, and magnifying about 200 diameters, we find the outside to consist of cuticular cells, carrying glandular hairs (*gh*, Fig. 664),

Nectary—*continued.*

which secrete a resinous body of strong odour. The cells on the opposite side of the section are not unlike those of the external cuticle, although they constitute the

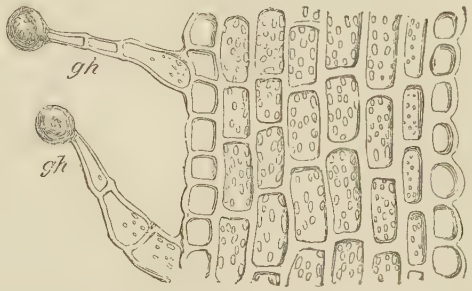


FIG. 664. VERTICAL SECTION THROUGH D, FIG. 663, showing (*gh*) Glandular Hairs.

lining of the upper part of the Nectary, for they have here no secretory function. Taking a section (see Fig. 665)

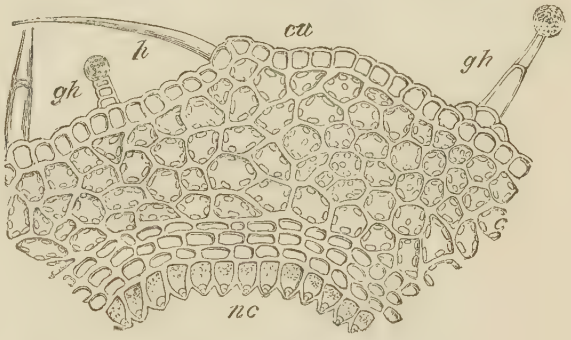


FIG. 665. CROSS SECTION THROUGH E, FIG. 663—*gh*, Glandular Hairs; *h*, Hair; *cu*, Cuticle; *nc*, Nectar Cells. Magnified 180 diameters.

from the face of E, which lies in the line *b* (A, Fig. 663), we discover the hairs and cuticle to be of precisely the same character as those previously noticed; but the lining cells (*nc*) of this part of the Nectary are totally different, extending inwards by almost pointed prominences. The structure of the pointed cells is quite special, their contents, as seen under high magnifying power, being granular, especially near the cell-wall, which, at the prominence, is excessively thin, and has, lying immediately within it, a globular mass of highly refractive

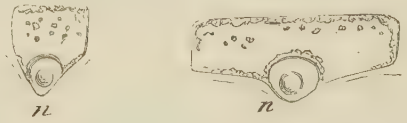


FIG. 666. NECTAR CELLS, Magnified 1000 diameters, showing (*n*) Nectariferous Nucleus.

protoplasm (*n*, Fig. 666), containing a distinct nucleus. This is the active agent in accomplishing the secretive act, and the surface of the cells here, in healthy plants, and in proper conditions of the atmosphere, will always be found to be coated with a layer of Nectar.

To understand the presence of Nectar in a plant, and the uses to which it is put, a short explanation is neces-

Nectary—*continued.*

sary in regard to the use of sugar to plants. There is reason to believe that sugar is one form in which part of the food, formed by plants for themselves from that taken in by them, is retained for a short time in a state that is readily available for use in forming new cell-walls in growing organs, or other substances of the same general composition. Wherever growth is active, sugar is present in the tissues, and gives its characteristic results when tested for. Hence, sugar is present, one may say, in the tissues of all flowers, whatever the mode of their fertilisation; but in some, the sugar is retained in the tissues, while in others it is contained in the surface cells, or oozes out on the surface of certain parts called Nectaries, which serve as the attraction to insects. Besides floral Nectaries, or those in the flowers, there are also in some plants (*e.g.*, in some Ferns and in the common Bean) extra floral Nectaries. In the Bean, they are on the stipules, and form a great attraction to bees in the search for honey. In the Bracken Fern (*Pteris aquilina*), the Nectar flows from small, pale swellings at the bases of the secondary petioles. It has been found that emission of water vapour into the atmosphere, and emission of Nectar on the surface of the Nectary, are so related that what favours the one, retards the other. In the flowers, it is usually emitted most abundantly in the early morning, diminishes till afternoon, and again increases towards evening. It is generally found to be more abundant in flowers of the same kind, the colder the climate.

The position of the Nectary (*n*, B, Fig. 663) now demands attention. It lies above the anthers and stigmas, and an insect, in seeking sweets, would insert the tongue with the body in such a position that its hairs would dust off the pollen, or else rub against the stigmatic faces. It may be observed, in a Pelargonium truss, that recently-opened blossoms have their anthers

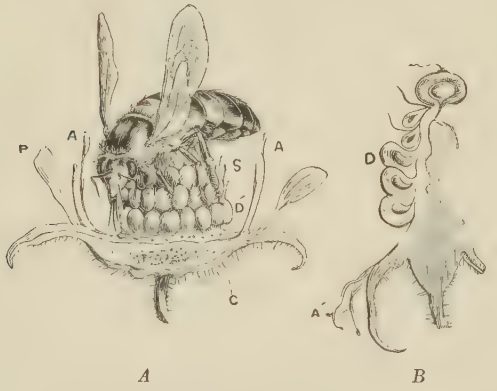


FIG. 667. *A*, BEE GATHERING NECTAR FROM RASPBERRY BLOSSOM —A, Anther; S, Stigma; C, Nectary Opening; P, Petal; D, Drupel. *B*, SECTION THROUGH RIPE FRUIT, showing Fertilised and Unfertilised Drupels—A', Withered Anthers; D, Drupels.

already shedding their pollen, while the stigmatic faces are held firmly in mutual contact, so that fertilisation is impossible; but that older blossoms, from which the pollen has all, or nearly all, disappeared, have their stigmatic surfaces exposed, since they have separated and curled back upon the top of the style, as at *s*, C, Fig. 663 — clearly pointing to an effort to secure cross-fertilisation. If an insect visits a young flower with stigmas not yet receptive, it nevertheless secures pollen on its breast, which it transfers to the stigmas of older flowers, when seeking their Nectar.

The enormous importance of insects' visits has not,

Nectary—*continued.*

until recently, been realised. *See* **Hybridising** To mention only a few instances, our orchard and fruit crops, and leguminous seeds, forming together no inconsiderable fraction of human food, are very largely dependent upon insect agency, and the fee paid for professional attendance on the part of the insect inoculator, is Nectar. Let us take, as an illustration, a common Raspberry. The nectar glands have their tiny openings (C, Fig. 667) set in a ring just within the very numerous anther filaments. The stigmas (S) of the various drupels (D) need the pollen to be passed from the anthers (A) to the surfaces of the former, but the interval between the two is considerable. A bee settles, and, in applying her tongue consecutively to the circularly-disposed sources of supply, makes a revolution. The side of the body is thus dusted with pollen; but this is not transferred to the stigmas. Flitting to a neighbouring blossom, she generally revolves the body in the opposite direction, so as to rest the legs previously most exercised, and so transfers the pollen before gathered to the waiting stigmas, thus securing cross-fertilisation. If the stigmas be not in this way pollinated, the drupels do not develop, and we get, on part of the Raspberry, shrunken greenish-grey abortions, of which two are seen in the section. These failures are common late in the season, in consequence of imperfect insect action.

NECTRIS AQUATICA. A synonym of **Cabomba aquatica** (which *see*).

NEEDLE FURZE. *See* **Genista anglica.**

NEGUNDO (said to be a native Asiatic name). Box Elder. ORD. *Sapindaceæ*. A small genus (four species) of hardy trees, allied to *Acer*; they are natives of temperate North America and Japan. Flowers dicœcious, small, long-stalked, pendulous, unfolding before the leaves; the males cymose-fasciculate, the females racemose and shortly pedicellate. Leaves opposite, pinnately three to five-foliolate; leaflets petiolulate, induplicate in vernation. For culture, *see* **Acer.**

N. aceroides (Maple-like).* *fl.* green, dicœcious; males in fascicles, on filiform pedicels; females in racemes; petals absent. Spring. *l.* pinnate, with three to five opposite, coarsely and deeply toothed leaflets, with the odd one usually three-lobed. *h.* 40ft. North America, 1688. A very ornamental tree. SYN. *N. fraxinifolium.*

N. a. crispum (curled). A form having its leaves variously cut and curled, but not nearly so vigorous as the type.

N. a. laciniatum (laciniated). *l.* more deeply cut than those of *N. a. crispum*. This is also less vigorous than the typical species.

N. a. variegatum (variegated).* A handsome variegated-leaved kind.

N. cissifolium (Cissus-leaved). *l.* trifoliolate, small, light green. *h.* 5ft. to 10ft. Japan. An elegant small species. SYN. *Acer cissifolium.*

N. fraxinifolium (Ash-leaved). A synonym of *N. aceroides.*

N. nikoense (Niko). *l.* trifoliolate, shortly stalked, the petioles and under surfaces of which, as well as the shoots, the buds, and the cells of the large fruits, are very hairy. Japan, 1881. A most distinct species.

NEILLIA (named after Patrick Neill, of Edinburgh, secretary of the Caledonian Horticultural Society, in the early part of this century). SYN. *Adenilenia.* ORD. *Rosaceæ*. A genus comprising four or five species of hardy branching shrubs, inhabiting Northern India and Java, Manchuria, and North America. Flowers white, racemose or paniculate, rather large; calyx persistent; tube campanulate or broadly turbinate. Leaves simple, variously lobed and toothed. The species here described are probably the only ones introduced. They form excellent plants for shrubberies; the two last-named, however, require a little protection in winter. Almost any soil will suit them, and propagation is effected by

Neillia—*continued.*

nearly ripe cuttings, inserted in sand, with a hand glass over them; or by seeds.

N. amurensis (Amur). *fl.* white; filaments of stamens reddish. Summer. *l.* subcordate-orbiculate, three to five-lobed; lobes acute, sharply doubly serrated, with a thin white stellate pubescence beneath. *h.* 4ft. to 7ft. Amurland. A compact-growing, handsome shrub. (R. G. 489, under name of *Spiræa amurensis*.)

N. opulifolia (Guelder Rose-leaved).* *fl.* white, disposed in umbel-like corymbs, and succeeded by purplish, membranous pods. June. *l.* roundish, palmately somewhat three-lobed and heart-shaped. *h.* 5ft. North America, 1690. SYN. *Spiræa opulifolia.*

N. o. aurea (golden).* This only differs from the type in the fine golden-yellow tint retained almost throughout the season by the leaves.

N. rubiflora (Bramble-flowered). *fl.* twice the size of those of *N. thyrsiflora*; racemes terminal, solitary; calyx furnished with pedicellate glands. *l.* cordate, three-lobed, acuminated, doubly serrated; stipules entire. *h.* 6ft. Nepaul.

N. thyrsiflora (thyrse-flowered). *fl.*, racemes spicate, disposed in a terminal thyrse; calyx silky. *l.* cordate-ovate, three lobed, doubly serrated. *h.* 6ft. Nepaul.

NEIPPERGIA. A synonym of *Acineta.*

NEJA (a meaningless name, invented for this genus by Don). ORD. *Compositæ.* A small genus (now regarded, by Bentham and Hooker, as synonymous with *Hysterionica*) of half-hardy herbaceous perennials or under-shrubs, generally hispid with long spreading hairs, and bearing scattered, narrow, linear, finely-pointed leaves. The undermentioned is a compact little plant, and produces an abundance of flower-heads. It has a very neat appearance in the borders, and thrives in any common garden soil. Propagated by seeds, or by divisions.

N. gracilis (slender).* *fl.-heads* yellow, solitary, on long stalks. May to October. *h.* 1ft. Uruguay (wrongly ascribed to Mexico, in books), 1828.

NELITRIS (from *ne*, privative, and *elytron*, a seed-case; in reference to the berry being without any partitions). SYN. *Decaspermum.* ORD. *Myrtaceæ.* A genus of stove shrubs or small trees, natives of tropical (mostly Eastern) Asia, and tropical Australia. About a score plants have been described by various authors; but probably not more than four or five are worthy of specific rank. Flowers small, pedicellate, in axillary racemes, or often forming terminal, leafy panicles. Leaves opposite, penniveined. The undermentioned species thrive in a well-drained mixture, composed of turfy loam, to which may be added about a third of dry cow-manure and a small quantity of sand. Throughout the growing season, they require an abundant supply of water, but must be kept drier during the season of rest. Cuttings of half-ripened shoots root in sandy soil, when placed under a bell glass, in bottom heat.

N. Jambosella (Jambosella). *fl.* white; peduncles axillary, one-flowered, nearly the length of the leaves. *l.* ovate, acute, *h.* 6ft. to 8ft. New Caledonia, 1810. Shrub.

N. paniculata (paniculate). *fl.* white, terminal, axillary, paniculate. May. *l.* oblong, acuminate. *h.* 10ft. Moluccas, 1826. Shrub.

NELUMBIUM (*Nelumbo* is the Cingalese name of *N. speciosum*). Sacred, or Water Bean. SYN. *Cyamus.* ORD. *Nymphæaceæ.* This genus comprises only a couple of species of beautiful greenhouse or nearly hardy aquatic plants, of which one is American and the other Asiatic or Australian. Flowers on long stalks, traversed by a number of air-canals, regularly disposed; corolla of numerous deciduous petals, arranged in several rows; "the stamens are numerous in several rows, attached with the petals to the base of the receptacle; the stigma is sessile; the receptacle or torus is in form like a funnel; and the ovaries, which are numerous,

Nelumbium—*continued.*

are placed in sockets on the upper surface" (Masters). Leaves peltate, on the summit of long cylindrical leaf-stalks, springing from an elegant horizontal rootstock. The species thrive in a compost of rich loam and well-decomposed manure. Under glass the rhizomes may be placed a few inches, or a foot or more, beneath the surface of the water; in warm tanks or ponds outside there should be, at least, a foot of water above them. They are admirably suited for large aquaria, under glass, and would, probably, thrive in tanks in the open air in the South of England. In the Jardin des Plantes, at Paris, a large circular tank, sunk below the level of the ground, is planted with *N. speciosum*, and forms a very attractive feature of the gardens during summer. In autumn, after the leaves have died off, a glass cover is placed over the tank, and throughout winter a covering of straw, or some other protecting material, as well. In spring the latter is removed, and afterwards the glass cover, when growth has sufficiently advanced, and all danger of frost has passed.

FIG. 668. NELUMBIUM LUTEUM.

N. luteum (yellow).* *fl.* yellow, fragrant, resembling a double Tulip, very large, sometimes spreading out more than 1ft. in diameter; anthers drawn out beyond the cells into a linear appendage. July. *l.* of a peculiar bluish-green, 12in. to 15in. in diameter. West Indies and Southern United States, 1810. See Fig. 668. (B. M. 3753.)

N. speciosum (showy).* Egyptian Bean of Pythagoras. *fl.* white, rosy-tipped, very fragrant, about 1ft. in diameter; anthers drawn out beyond the cells into a club-shaped appendage; peduncles longer than the petioles, erect, scabrous. Summer. *l.* large, 1ft. to 2ft. in diameter, exactly peltate in the centre, orbicular-entire, glabrous, under surface palest; margins somewhat waved; petioles long, rising beyond the surface of the water, scabrous with acute tubercles. Trunk of the root horizontal, fleshy, white, sending out many fibres from the under surface. Asia, 1787. A beautiful aquatic, which should be grown in tubs, and

Nelumbium—*continued.*

placed in shallow water. It thrives in warm sheltered tanks in the open during summer. This plant has been regarded from the most remote periods as the emblem of fertility. (B. M. 903, 3916, 3917.) There are several varieties of this species.

NEMACONIA. A synonym of **Ponera** (which *see*).

NEMASTYLIS (from *nema*, a thread, and *stylos*, a column; referring to the slender style). SYNS. *Chlamydostylis*, *Eustylis*, *Nemostylis*. ORD. *Irideæ*. A genus comprising about half-a-dozen species of half-hardy bulbs, natives of Mexico and North and tropical America. Flowers in few or somewhat numerous-flowered spathes, pedicellate; perianth segments ovate; spathe oblong or narrow. Leaves narrow, long, sometimes sub-terete, rarely narrow-ensiform; floral leaves one or two. Bulb tunicated. The species thrive in well-drained sandy loam: for pot culture they do best in a cold frame near the glass, or in a light, cool house. After the leaves have died off, the pots must be kept dry and stored in a cool place until the following spring. Increased by bulb offsets, or by seeds.

N. acuta (acute).* *fl.* blue, yellow, black, solitary, terminal, very fugacious, falling to pieces within a few hours of their opening. *h.* 6in. South-western United States, 1875. SYN. *N. geminiflora*. (B. M. 6666.)

N. cœlestina (celestial blue). *fl.* bright blue, mostly solitary, terminal; perianth six-parted, the divisions oblong-obovate. May and June. *l.*, radical ones few, elongated, sheathing; stem ones diminishing upwards, the uppermost bract-like. Stem 1½ft. to 2ft. high. South United States, 1882. (R. G. 1081, Fig. 1.)

N. geminiflora (twin-flowered). A synonym of *N. acuta*.

NEMATANTHUS (from *nema*, *nematos*, a thread, and *anthos*, a flower; the flowers of one species hang down from long, thread-like footstalks). ORD. *Gesneraceæ*. A small genus (three or four species) of very ornamental, stove, evergreen, climbing, fleshy, Brazilian shrubs. Flowers large, solitary or twin, axillary; corolla with an obconical tube gradually merging into a funnel or bell-shaped expansion. Leaves opposite, thick, entire, glabrous. The species thrive in a compost of sandy peat and turfy loam, with charcoal and dried cowdung. Propagation may be freely effected by cuttings inserted in sandy soil, and kept rather dry.

N. chloronema (green-threaded). *fl.* scarlet, 2in. long, beset with white hairs outside. July. *l.* oblong-lanceolate, acuminated at both ends. 1841. (B. M. 4080.)

N. corticicola (epiphytal). *fl.* scarlet, beset with scattered minute hairs; peduncles 6in. to 12in. long, clothed with violaceous and white hairs. *l.* broad-lanceolate, acuminated at both ends. 1848. (B. M. 4460; F. d. S. 498, under name of *N. ionema*.)

N. ionema (violet-threaded). A synonym of *N. corticicola*.

N. longipes (long-stalked). *fl.* bright red, about 2in. long, with the segments of the tube suddenly reflexed; stalks thread-like, 3in. long. December. *l.* thick, fleshy, oblong, deep green. Stems erect, 1½ft. high. 1841. (B. M. 4018.)

NEMATOCERAS. A synonym of *Corysanthes*.

NEMATOID WORMS (*Anguillulidæ*). The importance of this group of microscopic animals, as giving rise to disease in both wild and cultivated plants, is becoming ever more fully recognised with the extension of careful researches into the nature of diseases that were formerly ill-understood. They differ much from the earthworms, and other true worms, and exhibit a much lower type of structure. They are minute, white or translucent, and usually so small as to resemble short, slender, pieces of hair, even when visible at all without a magnifying glass. All those kinds that cause disease in plants are very minute, and live in the interior of the parts they attack, so that these parts must be cut into, or opened, before worms can be discovered. When seen through a microscope, they appear slender, tapering both ways, but the front end, in which is the mouth, is rather blunt, the hinder end, or tail, is usually long, and tapers gradually, or it may bear an extension of the skin along one or both sides. There is no head; nor are there limbs or organs of sense of

Nematoid Worms—*continued.*

any kind visible. The mouth opens in front; on the gullet and intestines there are usually two swollen muscular bodies, which serve for helping to prepare the food in its passage downwards. The intestine opens below in the anus, some distance from the end of the body, the tail, of varying length, lying behind it. The characters of the genera and species are recognisable usually in the mature animals alone. The situation of the sexual openings, and, in the males, two horny outgrowths, connected with reproduction, assist in supplying distinctive characters, as do also peculiarities in the internal organs, which can be made out, with no great difficulty under the microscope, in the living animals. The *Anguillulidæ* are very numerous in species, and they show considerable diversity in habits and modes of life. A few live as parasites in the intestines of animals, *e.g.*, *Oxyuris vermicularis* in man. Many, probably most, live free in damp earth, or in mud in which there is abundant decaying organic matter, or in decaying plant-remains under water. A certain number live in plants; some in the roots, producing galls or swellings; others in the green vegetative organs (*e.g.*, in leaves of Plantago, of some grasses, such as *Agrostis alba*), or in the ovary (*e.g.*, in Wheat). Only the plant parasites are here dealt with. They chiefly belong to a genus called *Tylenchus*, though much attention has been drawn to the ravages of another Nematode, known as *Heterodera Schachtii*, because of the injury done by it, in Germany, to the roots of the Sugar Beet, as well as to other plants—both wild and cultivated. The species of *Anguillulidæ* seem to be very widely diffused over the world; though the difficulties of identifying the species are so great as to render unreliable the conclusions arrived at by anyone save an expert. The plant parasites usually give rise to a much-increased growth of cellular tissue, thus producing galls of a characteristic aspect. On microscopic examination of sections of the galls, the cells in them are generally found to be much larger than in healthy tissues, and less regular in arrangement and form; and they leave large inter-cellular spaces, or else one large, irregular central space, in which are found numerous young animals, together with oval or cylindrical eggs, the walls of which are so thin as to allow the young animal coiled up in each to be easily seen. Less frequently, along with these may be seen one or two mature individuals. The galls have usually a peculiar colour, due to sap in the cells near the surface. As a rule, there is no trace of an opening to be seen in the mature galls. The young animals seem to be dispersed chiefly by the galls decaying and setting free the eggs or young in the soil, to be blown about with the dust in dry weather. Several of the species—notably that which causes "bunt" in wheat (*Tylenchus Tritici*)—have a curious faculty of reviving in moisture, after having been dried up for months, or even years. They also seem capable of enduring extremes of cold and heat, up to 125deg. Fahr., without being destroyed; and they are not susceptible to vegetable poisons, though they perish in solutions of acids and of most metallic compounds. In pure water, they survive for a long time.

Cereals are very liable to be attacked, *Tylenchus Tritici* galling the ovaries, while *T. devastatrix*, Kühn (*T. dipsaci*, J. Kühn), attacks the stalk, and the inflorescences of the Rye, of various other grasses, and of many other plants, *e.g.*, the Teasel (*Dipsacus Fullonum*), Clovers, Buckwheat, &c., causing them to remain stunted, with short internodes, and to become yellow. The former species is not troublesome to gardeners; the second one is injurious to many cultivated, as well as to uncultivated, plants. Both species of *Tylenchus* live entirely hidden from sight, as already described. The males of the genus *Tylenchus* have usually a thin skin or free

Nematoid Worms—*continued.*

membrane attached along one side of the hinder part of the body and the tail. Many other plants suffer through attacks of animals of the same genus; but the hurtful species are not fully known, and considerable doubt exists as to their true number as well as to their relationship to one another. During the past few years, their presence in a good many garden plants has been recorded in the "Gardeners' Chronicle," and other horticultural journals. The diseases produced by them often seriously damage, if they do not even kill, the plants. Not less dangerous than the above are the Nematodes that gall the roots of plants. The swellings usually are to be seen on the root tips, though often they occur higher up the root. They vary greatly in size, from little larger than a pin's head, on fine roots, to the size of a hazel-nut, or even larger. They are usually nearly round, or oval, though irregular forms are also common. The swelling is due to increase in the cellular tissue alone, the fibro-vascular tissue being hardly altered in any way. They are known to occur on a very large number of plants, both native and exotic, wild and cultivated, from grasses to Clover, and even on Coffee-trees, in South America. Among the most valuable plants injured by them must be specially mentioned the Sugar Beet, in its various forms, and also occasionally the Grape Vine.

In the galled roots of many plants a Nematode is met with, characterised by the fertile female becoming swollen, so as to resemble a lemon in form, with traces of the head and tail at the two ends. The female's body becomes united to the surrounding tissues, so as ultimately to look like a large cell merely, in which lie eggs, or young larvæ newly emerged from the eggs. This Nematode has received the name of *Heterodera Schachtii*. Attempts have been made to show that almost all root galls of Nematodes are the work of this species; but in Scotland the writer has never met with *Heterodera* in root-galls, but only with true species of *Tylenchus*. The animals, in autumn, pass from the food-plants, when these die and decay, into the surrounding soil, ready to make their way the following spring to the new crop of food-plants, should there be any such within their reach. Hence, the best mode of prevention consists in changing the crops on any piece of ground, so as to prevent suitable food for the Nematodes being afforded during the ensuing season. On infested soil, therefore, plants liable to attack should be followed by others unsuitable as food for the Worms. It is well, also, to use only clean seed, from a crop in which the disease has not appeared; and farmyard manure is somewhat dangerous, as liable to spread the Worms from diseased to healthy plants, either in the garden or the field.

If any plants show signs of being severely attacked, they should be at once burnt, to prevent extension of the disease from them to others that are healthy.

NEMATOPHYLLUM. Included under **Templetonia** (which *see*).

NEMATOSTIGMA, of Dietrich. A synonym of **Libertia** (which *see*).

NEMATUS. A very large genus of *Tenthredinidæ*, or Sawflies, of much importance because of the harm done by the larvæ to various trees and shrubs, but especially to Willows, Gooseberries, and Currants. They are the type of a sub-family, *Nematina*, that has the larva provided with fourteen sucker feet. In this sub-family it is distinguished from the other genera by the form and arrangements of the nerves of the front wings, and of the cellules formed by them. The insects are never large, and they bear so great a likeness to one another that it is most difficult to distinguish the species, since they are mostly smooth and shining, are seldom, if ever, punctured, and do not vary in pubescence. By their colour, the species may be divided

Nematus—*continued.*

into groups: (1) Abdomen wholly black; (2) abdomen banded with red; (3) body black and yellow; (4) body wholly yellow, or slightly marked with black; (5) body green. These groups, however, grade into one another. Mr. Cameron, in his work on *British Sawflies*, says that there may be 400 species of this genus in Europe, and he describes 107 from Britain alone. The larvæ vary much in habits. Some are gregarious, while others are solitary; most feed exposed, but some roll up the edge of the leaves, to form a tube, in which they live; and others form pea or bean-shaped galls on the leaves of Willows. Indeed, few kinds of these latter plants are entirely free from their galls; while on some bushes almost every leaf is loaded with them. The larvæ, when full fed, generally burrow an inch or two into the soil, and there form cocoons. The pupæ are usually green, often with a mixture of orange. It is impossible here to enumerate all the trees and bushes that are attacked by the larvæ; but a few of the more important are described. Gooseberries are ravaged by *N. Ribesii*, *N. appendiculatus*, and *N. consobrinus*; *N. abbreviatus* feeds on Apples and Pears; several kinds feed on Alder, others on Birch; very many are to be found on Willows of all species. Of the Willow Sawflies, the following are gall-makers: *N. vesicator*, in bean-shaped galls in the leaves; *N. ischnocerus*, in rather long galls, in pairs along the midribs of the leaves; *N. baccarum*, *N. salicis-cinereæ*, and *N. bellus*, in pea-shaped galls on the lower surface of the leaves of various Willows; *N. herbaceæ*, in similar galls on *Salix herbacea*; *N. gallicola*, in the bean-shaped galls so plentiful in leaves of *Salix alba* and other large Willows; and *N. Bridgmanni*, in similar galls from Sallows; *N. Vacciniellus* forms galls on *Vaccinium Vitis-idæa*. For methods of checking the ravages of such larvæ as feed exposed, *see* **Gooseberry and Currant Sawfly.**

NEMESIA (an old Greek name employed by Dioscorides to denote an allied plant). ORD. *Scrophularineæ*. A genus comprising about a score species of very pretty, South African, greenhouse, slender, annual or perennial, sometimes suffruticose, herbs. Flowers racemose at the tips of the branches, or rarely solitary in the axils; pedicels ebracteolate; corolla yellow, white, violet, or various-coloured. Leaves opposite. The few species in cultivation are treated as hardy annuals. Propagated by seeds, sown in early spring, in any ordinary soil. The seedlings should be thinned out when large enough to handle.

N. cynanchifolia (Cynanchum-leaved).* *fl.* rich lilac-blue, in terminal clusters. Summer. *l.* ovate-lanceolate, remotely toothed. Stems square. *h.* 1½ft. to 2ft. 1879. A pretty species. (G. C. n. s., xii. 136.)

N. floribunda (bundle-flowered).* *fl.* white and yellow, fragrant, racemose. Summer. *l.* at length petiolate; upper ones sessile. *h.* 1ft. A very charming plant. (B. R. 1838, 39.)

N. versicolor (various-coloured). *fl.* blue, lilac, or yellow and white; racemes few-flowered. Summer. *l.* at length petiolate, ovate; upper ones few, remote, sessile, oblong-lanceolate or linear, entire or dentate. *h.* 6in. to 12in.

NEMIA. A synonym of **Manulea** (which *see*).

NEMOPANTHES (from *nema*, a thread, and *anthos*, a flower; in allusion to the filiform peduncle). Mountain Holly. SYN. *Nuttallia*, of De Candolle. ORD. *Ilicineæ*. A monotypic genus, the species being a very glabrous, much-branched, hardy shrub, with ornamental berries. It thrives best, in cold damp soils, in somewhat shaded spots, and is most readily propagated by means of seeds.

N. canadense (Canadian). *fl.* small, polygamo-dicœcious, on long and slender axillary peduncles, solitary or sparingly clustered; petals four or five, oblong-linear, spreading, distinct. May. *fr.* a light red drupe, with four or five bony nutlets. *l.* alternate, oblong, deciduous, entire or slightly toothed. *h.* 3ft. North America, 1802. SYNS. *Ilex canadensis* and *Prinos integrifolius*. (A. F. B. ii. 503.)

NEMOPHILA (from *nemos*, a grove, and *phileo*, to love; alluding to the place of growth of the species). ORD. *Hydrophyllaceæ*. A genus comprising seven or eight species of hardy, diffuse, annual herbs, indigenous to North America. Flowers blue, white or spotted, showy

FIG. 669. NEMOPHILA INSIGNIS.

or small, terminal or opposite the leaves, on elongated, one-flowered peduncles, rarely shortly pedicellate, disposed in terminal few-flowered cymes; corolla broadly campanulate or sub-rotate; lobes five, broad, imbricated.

FIG. 670. FLOWERING BRANCH AND DETACHED BRANCHLET OF NEMOPHILA MACULATA.

Leaves alternate or opposite, pinnately lobed or dissected. The several species and varieties are of the easiest culture in any moderately good garden soil, and are admirably adapted for rockeries, borders, and beds. For a spring show, seeds should be sown early in August, where the plants are intended to flower; and, for summer display, any time during April.

Nemophila—*continued.*

N. atomaria (speckled). A synonym of *N. Menziesii*.

N. aurita (ear-leaved). *fl.* purple-violet, nearly 1in. in diameter. June. *l.* pinnate, hairy, produced at the base in two lateral ear-like lobes, which embrace the stem. *h.* 1½ft. 1831. (B. R. 1601; S. B. F. G. ser. ii. 338.)

N. insignis (remarkable).* *fl.* sky-blue, with a white eye, more than 1in. in diameter; peduncles longer than the leaves. Spring and summer. *l.* with three or four lobes on each side, quite entire, or cut. *h.* 1½ft. 1822. See Fig. 669. (B. M. 3485; B. R. 1713; S. B. F. G. ser. ii. 329.) The prettiest and best species, of which there are several varieties, including *alba*, white; *marginata*, blue, with a white edge; and *purpurea rosea*, purplish-rose.

N. maculata (spotted).* *fl.* white, with a violet-purple blotch on each lobe of the large corolla. Summer. *l.* very hairy, pinnatifid, with rounded, acute, or obtuse lobes. *h.* 6in. 1848. See Fig. 670. (F. d. S. 431.)

N. Menziesii (Menzies').* *fl.* white to light blue, commonly with dark dots or spots; peduncles axillary, elongated; corolla rotate, with a very pilose bottom. Summer. *l.* opposite, pinnatifid; lobes five to nine, almost entire. *h.* 4in. 1836. (B. M. 3774; B. R. 1940; S. B. F. G. ser. ii. 376, under name of *N. atomaria*.) There are a few pretty varieties of this species, such as *alba*, white and black centre; *cœlestis*, with sky-blue margin; and *oculata*, pale blue and black centre. *N. discoidalis* is a garden variety of this species, having rather smaller purple-brown flowers, edged with white.

N. phacelioides (Phacelia-like). *fl.* blue, with a white eye. Summer. *l.* more or less pinnatifid, broadest in the middle, and narrowed into a short petiole at the base. *h.* 1ft. 1822. (B. M. 2373; B. R. 740; S. B. F. G. 32.)

NEMOROSUS. Growing in groves.

NEMOSTYLIS. A synonym of **Nemastylis** (which *see*).

NENGA (said to be the Malay name of the plant). ORD. *Palmæ*. A monotypic genus, the species being an elegant, unarmed, stove Palm. It thrives best in a fibrous peat, to which a little leaf mould and sharp sand may be added with advantage. If well-drained, and not over-potted, it can scarcely be supplied with too much water. Propagated by imported seeds.

N. pumila (dwarf). *fl.* whitish; spadix shortly pedunculate; spathes two, lower one complete, lanceolate, complicate bicristate; upper one incomplete, persistent, or none. *fr.* reddish-yellow, small. *l.* terminal, equally pinnatisect; segments linear-acuminate or obliquely two or three-fid; margins reduplicate at base; primary nerves sparsely scaly underneath; rachis trigonous; petioles short. Stem slender, tall, annulate; branches slender, pendulous. Malay.

NENGELLA (a diminutive of *Nenga*). ORD. *Palmæ*. A small genus (two or three species) of low, unarmed, stove Palms, with reedlike, annulate stems, natives of the Malayan Archipelago and New Guinea. Flowers small, the females shorter than the males; complete spathes two, elongated, membranous, complanate, deciduous; spadix slender, pendulous, slightly flexuous; bracts and bracteoles scale-formed. Fruit small, elongated. Leaves terminal, equally pinnatisect or flabelliform and furcate; upper segments truncate, many-nerved, erose or cut; lower ones linear-lanceolate, long-acuminate; margins recurved at base; rachis and petiole trigonal. *N. paradoxa*, the only species in cultivation, requires a compost of loam and leaf soil, to which some sharp sand or charcoal should be added. As the plants become established, more loam should be added than when they were in a young state. Propagated by imported seeds.

N. paradoxa (paradoxical). *l.* 12in. to 18in. long, about 8in. broad; petiole with a long, striate, rusty-coloured sheath; blade pinnate; pinnules, 6in. to 8in. long, very unequal. Stem slender, 5ft. to 7ft. high; crown consisting of six or eight leaves.

NEOGYNE. Included under *Cœlogyne*.

NEOLEXIS. A synonym of **Smilacina** (which *see*).

NEOTTIA (from *neottia*, a bird's nest; referring to the interlacing of the numerous roots). Lady's Tresses. SYN. *Neottidium*. ORD. *Orchideæ*. A small genus of hardy terrestrial Orchids, closely allied to *Listera*, but having a longer column, and generally a cucullate anther-bed. The three species known are leafless, brown-stemmed

Neottia—*continued.*

plants, with sheathing scales, natives of Europe and the Northern and mountainous regions of Asia. They are of little horticultural value. The undermentioned species is found generally in dark woods in many parts of England, Ireland, and Southern and Central Scotland.

N. Nidus-avis (bird's-nest). *fl.*, sepals broadly ovate, almost acute; petals more rounded; lip twice as long, deeply bilobed at the extremity; spike dense, 3in. to 4in. long. Spring and early summer. Stem 1ft. or more high, and, as well as the sheathing scales which replace the leaves, light brown. Roots a mass of succulent, stout, interlaced fibres. (Sy. En. B. 1478.)

NEOTTIDIUM. A synonym of **Neottia** (which *see*).

NEOTTOPTERIS. Included under **Asplenium** (which *see*).

NEPENTHACEÆ. A monotypic order of curious shrubs or sub-shrubs, inhabiting tropical Asia, Madagascar, the Seychelles, tropical Australia, New Caledonia, and especially the Malayan Archipelago. Flowers greenish (when dry, dark brown or purple), small, diœcious. Seeds at first floating, and imbibing the water; afterwards sinking to the bottom, where they germinate. "Leaves alternate; petiole winged at the base, the midrib prolonged at the top, and curved or spirally twisted, and terminating in a second foliaceous expansion, which is hollowed like an urn (the pitcher), to the opening of which is fitted a sort of lid, attached as by a hinge, and capable of being lowered or raised, so that the pitcher is sometimes closed, sometimes open. It is often found to contain a watery liquid before the raising of the lid" (Le Maoût and Decaisne). *Nepenthes*—the only genus—comprises upwards of thirty species.

NEPENTHES (an old Greek name of a plant used by Homer; the word means grief-assuaging, and is used in reference to supposed medicinal qualities). Pitcher-plant. SYN. *Phyllamphora.* The only genus of ORD. *Nepenthaceæ* (which *see* for characters). The species of this genus are not of difficult culture, provided they are kept in a moist atmosphere, where a temperature of from 70deg. to 80deg. is maintained during summer, and 65deg. in winter. They succeed best in a compost of two parts brown peat fibre and one of sphagnum. Nepenthes are most suitable for basket culture, and require an abundant supply of water in summer. Propagation may be effected by cuttings of well-ripened one-year-old shoots, plunged into a strong bottom heat; or by seeds, when procurable. The latter should be thinly sown in a seed-pan, filled to within 1in. of its rim with a compost similar to that already described, a little water being carefully sprinkled over the surface previous to sowing. The pan should then be placed in a moist, close frame, having a bottom heat of 80deg. to 85deg. Germination will ensue in about one month from the time of sowing. When several leaves appear, the seedlings should be transplanted into small pots.

N. albo-marginata (white-margined). *l.* narrow, 9in. to 12in. long. Pitchers light green below, reddish above, having a distinct white ring towards the mouth. Singapore, 1848. A very dwarf-growing species, admirably suited for basket culture. (G. C. 1849, 580; T. L. S. xxii. 73.)

N. ampullaria (bottle-like). *l.* broad, oblong, with somewhat ovate pitchers; terminal lid very small; colour a uniform light green. Borneo, &c., 1789. A robust-growing species. (B. M. 5109; F. d. S. 2325.)

N. a. picta (spotted). A variety having light green pitchers, streaked and spotted with reddish-brown.

N. a. vittata major (larger-striped). A form having relatively small flask-shaped pitchers, with two fringed wings and a small lid, the pitcher itself elegantly mottled with reddish blotches on a green ground. (I. H. 272.)

N. angustifolia (narrow-leaved). *l.* sub-coriaceous, sessile, amplexicaul, decurrent, narrowly lanceolate, acuminate, with the midrib prolonged into a long tendril. Pitchers green, spotted with red, 1¾in. to 2in. long, flask-shaped, distended at the base, gradually passing into an elongated, cylindrical neck; wings narrow, fringed; mouth obliquely ovate, sulcate-striate; lid glabrous, cordate, sub-orbicular, with a short, entire, pinnatisect spur at the base. Sarawak, 1881.

Nepenthes—*continued.*

N. atro-sanguinea (dark-blood-red).* *l.* stalked. Pitchers reddish-crimson, slightly spotted with yellow, about 6in. by 2½in., pointed at the base, distended at the lower half, cylindric above; wings broad, fringed; mouth ovate, acute, slightly prolonged towards the lid, and surrounded by a flattish rim, marked with close ridges, some red, others blackish; lid about the size of the mouth, oblong, emarginate, with a simple spur at the base. 1882. A handsome garden hybrid, probably a cross between *N. rubra* and *N. Sedeni.* (G. C. n. s., xvii. 827.)

N. bicalcarata (two-spurred).* *l.* of a peculiar dark green, obovate-lanceolate. Pitchers bag-shaped, covered when young with a fluffy rust-coloured down, and provided with two sharply-toothed wings when fully developed; neck thrown into ridges with intervening furrows, and prolonged at the back into an erect or slightly incurved process, terminating in the two recurved spurs, like the fangs of a snake with its head uplifted to strike. Borneo, 1878. (G. C. n. s., xiii. 201.)

FIG. 671. STEM OF NEPENTHES DISTILLATORIA.

N. chelsonii (Chelsea). A garden hybrid between *N. Dominiana* and *N. Hookeriana*, and having a habit intermediate between the two. It is well worth growing.

N. cincta (girded). *l.* approximate, 12in. by 3in., coriaceous, oblong-lanceolate, tapering to a broad dilated base, dark green; midrib somewhat angular on the lower surface. Pitchers green, flushed with red, and with numerous irregular purple blotches, tubular, slightly ventricose, rounded at base, 7in. to 8in. by 2½in.; rim very oblique, ¼in. broad, undulate, lobed, finely ribbed, with a narrow whitish band around the top of the tube; lower half thicker in texture than the upper; lid orbicular and two-ribbed, arching over the mouth of the pitcher. Stems cylindrical, stout. Borneo, 1884. (G. C. n. s., xxi. 110.)

N. coccinea (scarlet).* *l.* acute at apex. Pitchers crimson, slightly speckled with yellow, 6in. by 3in., flask-shaped, pointed at the base, distended below the middle, broadly cylindric above; wings deeply fringed; mouth ovate, acute, slightly protracted at the back; rim broad, finely ribbed, the ribs parti-coloured red and black; throat greenish, speckled with red; lid ovate-oblong,

Nepenthes—*continued.*

smaller than the mouth, greenish, striped and speckled with red. 1882. A hybrid of American origin. (G. C. n. s., xviii. 29.)

N. Courtii (Court's).* *l.* dark green, coriaceous, lanceolate, acute at the apex, tapering towards the base, which expands to clasp the stem. Pitchers dull greyish-green, spotted with red, about 5in. by 2½in., distended at the base, cylindrical above the middle, with deep, sharply laciniate wings, equal in width all the way down; mouth ovate, finely and evenly ribbed; lid somewhat convex-ovate, smaller than the mouth, and with a single spur at the back. 1881. A remarkably handsome hybrid, raised by Mr. Court at Messrs. Veitch's. (G. C. n. s., xvi. 845.)

N. distillatoria (distilling). *l.* bright light green. Pitchers 6in. to 8in. long. Ceylon, 1789. A very desirable species, of free growth, and requiring less heat than any other. See Fig. 671. A variety named *rubra* is very distinct and ornamental, having deep blood-red pitchers.

N. distillatoria (distilling), of Graham. A synonym of *N. Khasiana.*

N. Dominiana (Dominy's). *l.* dark green, coriaceous, broad, oblong. Pitchers deep green, and slightly spotted, several inches in height. A handsome garden hybrid, of robust growth.

N. Dormanniana (Dormann's).* *l.* broadly lanceolate, acute at the apex, finely ciliate at the edges. Pitchers green, heavily spotted with deep red blotches, nearly 6in. by 3in., flask-shaped, pointed at the base, distended below the middle, tapering upwards into a broad tube, the rim of which is broad, finely ribbed, and slightly oblique; wings deep, fringed at the edges, and rounded at the base; lid broadly ovate, with a simple spur at the base. A fine hybrid, probably of American origin. (G. C. n. s., xvii. 525.)

N. hirsuta glabrescens (hairy-glabrescent). *l.* sub-amplexicaul, broad at the base, lanceolate. Pitchers 5in. by 1¾in., elongate, cylindrical, slightly dilated at the base, reddish, with conspicuous veins, or wholly green; wings deep fringed; mouth ovate, slightly prolonged at the back, surrounded by a greenish-yellow, finely-ribbed rim; lid about the size of the mouth, cordate, emarginate, with a simple spur. Borneo. (G. C. n. s., xvii. 399.)

N. Hookeriana (Hooker's).* *l.* coriaceous, nearly glabrous, acute at both ends. Pitchers spotted with red, sub-globose, or sometimes elongated, with a flattish, finely-ribbed margin surrounding the ovate mouth, and scarcely prolonged at the back; wings very deep, broad, rounded at both ends, and sharply laciniate at the margin; lid flat, obovate, emarginate, with a simple spur at the base. Sarawak, 1847. A very handsome plant, closely related to *N. Rafflesiana*, from which it differs in its short petiole, its venation, but more especially in the flatter (not hood-like) lid, and in the absence of the long process supporting it, which is so marked a feature of the latter. (G. C. n. s., xvi. 813.)

FIG. 672. LEAF AND PITCHER OF NEPENTHES MADAGASCARIENSIS.

N. hybrida (hybrid). *l.* deep green, oblong, broad. Pitchers dark green, about 8in. long, winged and ciliated in front. A garden hybrid. The variety *maculata* resembles the type in general appearance; but the pitchers, which are about 10in. long, are profusely streaked with reddish-purple upon a dark green ground.

N. intermedia (intermediate).* *l.* coriaceous, tapering to both ends. Pitchers green, spotted with red, about 6in. by 2½in., somewhat cylindrical, pointed at the base, slightly swollen in the middle; wings broad, rounded at the base, fringed; mouth obliquely ovate, prolonged at the back into a column supporting the lid, which is ovate-obtuse, slightly hooded. 1882. A handsome hybrid. (G. C. n. s., xvii. 179.)

Nepenthes—*continued.*

N. Kennedyana (Kennedy's). *l.* oblong-lanceolate, very acute, tapering at the base into a broadish, stem-clasping stalk. Pitchers reddish, over 5in. long by 1½in. wide, elongate-cylindrical, slightly dilated below the middle, tapering at the base, and with deep, sharply-fringed wings; mouth oblique, surrounded by a narrow, finely-ribbed rim; throat glaucous-violet; lid sub-orbicular, as large as the mouth, and with a simple spur at the base. Cape York, North Australia, 1882. (G. C. n. s., xvii. 257.)

FIG. 673. LEAF AND PITCHER OF NEPENTHES NORTHIANA.

N. Khasiana (Khasian).* *fl.* green, yellow, dicœcious, in a solitary raceme. *l.* entire, channelled, undulated, glabrous, 1ft. to 1½ft. long, including the petiole. Pitchers green, with purplish

Nepenthes—*continued.*

markings, 6½in. long, 4½in. in circumference, wedge-shaped behind when young; lid 2½in. by 2in. *h.* 6ft. China, 1789. (B. M. 2798, under name of *N. distillatoria.*)

N. lanata (woolly). *l.* deep green, glabrous above, paler, and thinly covered with blackish hairs beneath, coriaceous, oblong-obtuse, 1ft. or more long, gradually tapering at the base into a broad leafstalk. Pitchers greenish, about 6in. by 1½in., cylindrical, winged on the posterior side next the axis of the plant; wings toothed and fringed; mouth ovate, acute, prolonged anteriorly into a triangular neck; lid oblong or sub-orbicular, glandular on the under surface. Borneo, 1876. According to the "Gardeners' Chronicle," there has been a good deal of confusion as to the true *Nepenthes Veitchii*, which, however, is well figured by Sir Joseph Hooker, in his monograph, in the "Linnæan Transactions." Among other plants misnamed *N. Veitchii*, the subject of this note, must be included. By some oversight, the plate in the "Illustration Horticole" [1876, 261] bears the name of *N. lanata*, while the accompanying text is headed *N. Veitchii*, and the description given applies to that species.

N. Lawrenciana (Lawrence's).* Pitchers pale green, spotted profusely with dark crimson, 4in. long. 1880. A very distinct hybrid, between *N. Phyllamphora* and *N. Hookeriana*; it is of very compact growth, and the edges of its leaves are slightly serrated. (G. C. n. s., xiv. 40.)

N. madagascariensis (Madagascar).* *l.* coriaceous, oblong, gradually tapering at the base into a short, broad, amplexicaul stalk, and narrowing gradually into an acute lance-shaped point, terminating in a pitcher-bearing tendril. Pitcher crimson, 2½in. long, 1in. wide, thinly hairy, flask-shaped, with two membranous fringed wings in front; mouth nearly circular, surrounded by a narrow, closely-ribbed border, the throat of a pale cream-colour; lid transversely oblong, or somewhat kidney-shaped, obtuse at both ends, contracted in the middle, and with a small, simple, or laciniate spur at the back. Madagascar, 1881. A very handsome species. See Fig. 672 (for which we are indebted to Messrs. Veitch and Sons).

N. Mastersiana (Dr. Masters').* *l.* sessile, coriaceous, oblong-ovate, acute, reddish at the margins, auriculate-amplexicaul at the base; midrib depressed above, prominent beneath. Pitcher deep claret-red, 4½in. by 1½in., thinly hairy, here and there purple-spotted, cylindrical, somewhat ventricose, slightly contracted above the middle; wings deep, sharply and irregularly toothed at the margin; mouth rounded, surrounded by a clear, shining red, closely-ribbed margin; throat pinky-cream, with red spots; lid about the size of the mouth, sub-orbicular, convex. A hybrid, raised at Messrs. Veitch and Sons', between *N. Khasiana* and *N. sanguinea.* (G. C. n. s., xvi. 749; xxi. 248, 249.)

FIG. 674. NEPENTHES PHYLLAMPHORA, showing Habit, detached Portion of Inflorescence, and Pitcher.

N. Morganiæ (Mrs. Morgan's).* *l.* pale green, with red midribs, smooth. Pitchers beautifully mottled with bright red and pale green when young, almost self-coloured and blood-red in an adult stage, flask-shaped, 6in. to 8in. long, with two narrow ciliolate wings; lid always pale green. 1881. A beautiful hybrid, of dwarf, neat habit.

N. Northiana (Miss North's).* *l.* coriaceous, oblong-ovate, acute, tapering at the base into a short, broad, amplexicaul stalk. Pitchers purple-spotted, nearly 1ft. long, and ¾in. wide, sub-coriaceous or membranous, elongate, cylindric, slightly curved, with two membranous dentate-fimbriate wings; mouth elliptic, elongated, very oblique, 4in. by 1¾in., and surrounded by a broad, everted, closely and finely-ribbed margin or peristome; lid ovate-oblong, smooth, shiny on the inner surface, where it is sprinkled with small black dots. Borneo, 1881. A very beautiful and noble species. See Fig. 673 (for which we are indebted to Messrs. Veitch and Sons). (G. C. n. s., xvi. 717.)

Nepenthes—*continued.*

N. Outramiana (Outram's). *l.* shortly stalked, ovate, tapering to both ends. Pitchers 5in. long, of fine form, broad at the base, tapering into a cylindrical neck, pale yellowish-green, densely spotted with small dark blood-red spots, which in some instances coalesce and nearly cover the entire surface, while the interior and the mouth are also well marked. 1880. A handsome hybrid between *N. Sedeni* and *N. Hookeriana*, of very free growth. (F. M. n. s., 384.)

N. Phyllamphora (pitcher-leaved). *l.* bright green, large, broad, oblong. Pitchers the same colour as the leaves, 5in. to 10in. long, not winged, but furnished with a few hairs in front. Borneo, &c. A very handsome and free-growing species, with a somewhat robust habit. See Fig. 674. (B. M. 2629.)

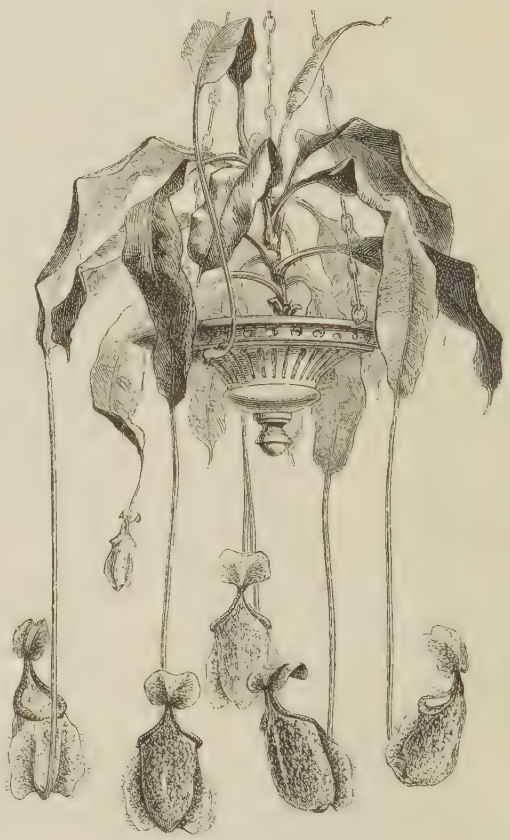


FIG. 675. NEPENTHES RAFFLESIANA.

N. Rafflesiana (Sir Stamford Raffles').* *fl.* yellow and brown; racemes at first terminal, eventually lateral, opposite a leaf. September. *l.* alternate, petiolate, the lower ones crowded and lanceolate, the upper ones more remote and oblong. Pitchers greenish-yellow, with brown markings, very handsome; remarkable for the very long process supporting the lid. Singapore, 1815. See Fig. 675. (B. M. 4285; F. d. S. 213, 214; G. C. n. s., ix. 177.)

N. R. insignis (remarkable). *l.* 18in. by 3in., with short, deeply-channelled leafstalks. Pitchers green, mottled purplish-brown, thickly beset with brownish hairs, 9in. long by 4in. wide, obliquely flask-shaped, the rim deeply and evenly ribbed. 1882. (G. C. n. s., xviii. 69.)

N. R. nigro-purpurea (dark purple). *l.* leathery, glabrescent, acute at both ends, with rather long channelled stalks. Pitchers dull purplish-brown, with a few paler spots, and a few brownish star-like hairs, 6½in. long by 2in. wide, distended; wings incurved, toothed; rim consisting of numerous closely-set ribs; lid 2in. by 1¾in. 1882. A distinct variety. (G. C. n. s., xviii. 70.)

N. Rajah (Rajah.)* *l.* coriaceous, oblong, tapering at the base into a conduplicate channelled-leaved stalk; apex rounded, tendril given off from the under surface a short distance below the apex. Pitchers dull purple, over 1ft. long, slightly hairy, broadly

Nepenthes—*continued.*

cylindrical or slightly saccate, somewhat dilated at the base, ribbed; ribs slightly fringed; mouth very broad, oval, purplish, closely ribbed, ribs ending in sharp comb-like points; lid suborbicular, spurred at the back. Borneo, 1881. A noble species. (G. C. n. s., xvi. 493.)

N. Ratcliffiana (Ratcliff's).* *l.* light green, linear-lanceolate, acute at both ends, 12in. to 15in. long, 1½in. wide. Pitchers green, spotted with red, 5in. to 6in. by 2in., flask-shaped; wings ciliate, broad or shallow, narrow at the base; mouth oblique, surrounded by a ribbed parti-coloured rim; lid about the size of the mouth, ovate, glandular on the inner surface, and with a simple spur at the base. An attractive hybrid, said to have been raised between *N. Hookeriana* and *N. Phyllamphora*. (G. C. n. s., xvii. 178.)

N. robusta (robust). A very free-growing hybrid, the result of a cross between *N. Hookeriana* and *N. Phyllamphora*, with pitchers intermediate in character between the two, but having the colour and markings of *N. Hookeriana*. The pitcher in this variety has a somewhat pear-shaped appearance. 1880.

N. rubra (red). Pitchers bright red, very large. Ceylon, 1868. A distinct and beautiful species, of slender habit, and very rare in cultivation.

N. rubro-maculata (red-spotted).* *l.* very dark green, partly amplexicaul, 12in. long, 2in. wide, rounded at the apex, coriaceous. Pitcher yellowish-green, spotted with claret-red, 5in. to 6in. long, 1¾in. wide, cylindrical, slightly distended at the base, deeply winged; wings fringed; mouth oblique, surrounded by a broad, flat rim, the ridges of which are deep red; lid much smaller than the mouth, ovate, red-spotted, glandular on the inner surface. A hybrid, raised by Messrs. Veitch in 1882. (G. C. n. s., xvii. 143.)

N. sanguinea (blood-red).* *l.* dark green. Pitchers of a deep blood-red, 5in. to 10in. long. East Indies. A beautiful but extremely rare species. (G. C. n. s., xi. 13.)

N. sanguinea (blood-red), of gardens. A synonym of *N. Veitchii*.

N. Sedeni (Seden's).* Pitchers light green, profusely blotched and freckled with brownish-crimson, medium-sized. A very desirable garden hybrid, obtained from seed, *N. distillatoria* being one of the parents, and whose habit it seems to bear. It produces pitchers very freely.

N. superba (superb). A hybrid, resembling *N. Hookeriana* in habit, but its pitchers are intermediate between those of that species and of *N. Sedeni*. 1881. (F. M. 434.)

N. Veitchii (Veitch's).* *l.* coriaceous, obovate-lanceolate, tapering at the base. Pitchers about 12in. long, somewhat cylindrical, narrowed at the base, with two deep, sharply-laciniate wings, the laciniæ themselves somewhat acutely lobed; mouth surrounded by a very broad everted border, strongly ribbed, the ribs ending in sharp teeth, which point downward; lid very small relatively to the mouth, oblong, keeled at the base. Borneo. A very handsome species. (B. M. 5080, under name of *N. villosa*; G. C. n. s., xvi. 781, and xviii. 809, under name of *N. sanguinea*.)

N. villosa (hairy). *l.* dark ferruginous-green, broad, somewhat spathulate. Pitchers dull green, faintly blotched with reddish-brown, 10in. to 12in. long, winged in front, the wings deeply lacerated at the edges; the annular disk of the mouth is very broad, and reddish-pink; lid small, rusty-green, blotched with reddish-brown. Borneo, 1855. A species rarely seen in cultivation.

N. villosa (hairy), of "Botanical Magazine." A synonym of *N. Veitchii*.

N. Williamsii (Williams').* This handsome form is a hybrid from *N. Sedeni* and *N. Hookeriana*, having the pitchers intermediate in shape between those of the two parents, these being 4in. to 5in. long, densely spotted with blood-red, the red in many cases predominating, while the interior is marked with the same colour; the under side of the lid is reddish-brown. 1880. (G. C. n. s., xiv. 40.)

N. Wrigleyana (Wrigley's). *l.* light green, 10in. to 12in. long, 1¾in. to 2in. wide, acute at both ends, glandular beneath. Pitchers pale green, with crimson spots, flask-shaped, with a thick cylindrical neck; wings narrow, ciliate; mouth oblique, ribbed; ribs all green; lid broadly oval, smaller than the mouth, glandular on the inner surface, and with a simple spur. A hybrid. 1882. (G. C. n. s., xvii. 143.)

NEPETA (an old Latin name used by Pliny, and probably derived from the town of Nepi, in Italy). Catmint. Including *Glechoma*. SYNS. *Cataria*, *Saussuria*. ORD. *Labiatæ*. A large genus (about 120 species) of hardy herbaceous plants, sometimes tall and erect, sometimes diffuse, perennial or annual, low or dwarf, broadly dispersed over the extra-tropical regions of the Northern hemisphere; a few extend between the tropics, and one species has been introduced to North America or South Africa. Corolla often blue or white, rarely yellow; tube slender at base, included or exserted; whorls often many-flowered, but varying. Leaves toothed or incised. The few species which are worth growing are of the easiest

Nepeta—*continued.*

culture, in any ordinary light sandy soil. Propagated by division of the plants, or by sowing seeds, in spring. All the species here described are perennials.

N. Glechoma (Glechoma). Ground Ivy. *fl.* blue, in axillary whorls of about six. April. *l.* reniform, crenate, stalked. Stems procumbent, frequently several feet long, creeping. Europe (Britain). A handsome plant, but too common to be of horticultural value. SYN. *Glechoma hederacea*. (Sy. En. B. 1055.) There is a form with variegated leaves.

N. Kokamirica (Kokamyran). *fl.* blue, in dense terminal spikes; lower lip of corolla reniform, emarginate. *l.* small, opposite, ovate-elliptic, crenately toothed. Kokamyr, 1879. (R. G. 1030.)

N. Mussini (Mussin's). *fl.* pale blue, verticillate; corolla tube longer than calyx, filiform, curved; throat compressed, funnel-shaped; upper lip divided almost to the base; lower lip large, crenate, hollow, spotted with white towards the throat; anthers purple, bilobed. May. *l.* cordate, oblong-oval, crenate, rugose, hoary beneath; lower ones on rather long petioles, upper ones sub-sessile. Stem divided at the base; branches long, weak, generally undivided, square, with obtuse angles. Caucasus. (B. M. 923.)

N. spicata (spike-flowered). *fl.* in terminal, sessile, or peduncled spikes, 2in. to 4in. long; corolla purple, with the lower lip nearly white. September. *l.* 1in. to 4in. long, broadly ovate-cordate, deeply serrate or toothed. *h.* 6in. to 12in. Western Himalayas, 1878. (B. M. 6405.)

NEPHELAPHYLLUM (from *nephele*, a cloud, and *phyllon*, a leaf; referring to the marks upon the leaves). ORD. *Orchideæ*. A small genus (four species) of creeping, stove, terrestrial Orchids, natives of the East Indies, Southern China, and the Malayan Archipelago. Flowers loose or densely racemose, on leafless scapes. Leaves stalked, ovate-lanceolate or cordate, usually purplish beneath, spotted or clouded above. The species thrive in a mixture of peat, fibre, and sphagnum, amongst which a few pieces of porous sandstone and charcoal may with advantage be placed. Generally speaking, they require somewhat similar treatment to *Anœctochilus*. The two species here given are probably the only ones yet introduced.

N. pulchrum (beautiful). *fl.* green, small, with a white lip. *l.* beautifully mottled with dark green. *h.* 3in. Java, 1860. (B. M. 5332.)

N. scapigerum (scape-bearing). *fl.* very pretty; lip white at the base, spotted with purple-brown in the middle and yellow at the tip. *l.* plain. *h.* 4in. to 6in. Borneo, 1863. A very desirable plant. (B. M. 5390.)

NEPHELIUM (an ancient name for Burdock, and applied to this genus on account of the rough fruits, which somewhat resemble those of Burdock). SYNS. *Dimocarpus* (in part), *Euphoria* (in part). ORD. *Sapindaceæ*. This genus comprises about a score species of handsome stove, evergreen trees, natives of the West Indies, the Indian Archipelago, and Australia. Flowers small, in axillary and terminal many-flowered panicles. Fruit globose or ovoid, smooth, or tubercled or warted, often edible. Leaves alternate, exstipulate, abruptly pinnate; leaflets entire or rarely serrate, in one species stipule-like. The species (of which the two here described are, in all probability, the only ones introduced) thrive in a good, well-drained, turfy loam, and, during the season of growth, like an occasional watering with liquid manure. Propagated by seeds, or by cuttings made of half-ripened wood.

N. Lit-chi (Lee Chee). *fl.* white, racemose, loose, forming a panicle. May. *fr.* a berry, cordate, scaly, disposed in loose racemes, red on one side and green on the other, containing a delicious white, sweet, sub-acid pulp, and a large seed. *l.*, leaflets three or four pairs, tapering to both ends, lanceolate, glaucous beneath. South China, 1786, widely cultivated in the tropics.

N. Longana (Longan). *fl.* white, in loose panicles. May. *fr.*, berries globose, almost smooth, with a yellowish, smooth skin; pulp white, tart, and juicy. *l.*, leaflets three pairs. *h.* 20ft. India, &c., 1786, cultivated in the tropics. (B. M. 4096.) This species is regarded by Bentham and Hooker as the type of the genus *Euphoria*.

N. verticillatum (whorled). A synonym of *Sapindus Danura*.

NEPHRANDRA. A synonym of **Vitex** (which *see*).

NEPHRANTHERA. A synonym of **Renanthera** (which *see*).

NEPHRODIUM (from *nephros*, a kidney; referring to the shape of the spore-cases). ORD. *Filices.* Including *Arthropteris* (in part), *Camptodium*, *Dryopteris*, *Lastrea*, *Pleocnemia*, and *Sagenia*. A very large genus (about 300 species) of stove, greenhouse, or hardy Ferns, widely distributed, and including species which vary considerably in size, texture, cutting, and venation. Sori sub-globose, dorsal or terminal on the veinlets; involucre cordate-reniform, attached by the sinus. Generally speaking, Nephrodiums are of very easy cultivation, the stronger growing kinds thriving best in good loam, and the weaker ones in loam, leaf mould, and sand, or peat and loam. Several species are most desirable subjects for Wardian cases and for planting in the cool fernery. For general culture, &c., *see* **Ferns.** Except where otherwise stated, stove treatment is required.

N. abortivum (abortive). *sti.* tufted, 6in. to 12in. long, firm, erect. *fronds* 1ft. to 2ft. long, 6in. to 8in. broad; central pinnæ 3in. to 4in. long, ⅛in. to ¼in. broad, cut about one-third of the way down into close, entire, truncate lobes, ¼in. broad; lower pinnæ distant, and reduced suddenly to mere auricles. *sori* medial. Penang, Java, and Ceylon.

N. abruptum (abrupt). A synonym of *N. truncatum.*

N. æmulum (rivalling).* Hay-scented Buckler Fern. *sti.* tufted, 1ft. long, densely scaly below. *fronds* lanceolate-deltoid, 1ft. to 1½ft. long, 6in. to 10in. broad, the lowest pinnæ much the largest; lowest pinnules larger than the others, which are ovate-lanceolate, cut down to the rachis below into deeply pinnatifid lobes, with aristate teeth; under surface glandular. Involucre not gland-ciliated. Britain, Madeira, and Azores. A handsome hardy species, smelling like hay when dried. SYNS. *N. fœnisecii* and *Lastrea recurva.*

N. albo-punctatum (white-spotted). *rhiz.* wide-creeping, scandent, scaly or naked. *sti.* naked, jointed. *fronds* 9in. to 12in. long, 4in. to 6in. broad; pinnæ spreading, 2in. to 3in. long, ½in. broad, cut half down to the rachis or more into oblong, blunt, entires lobes. *sori* terminal on the veinlets, near the edge. Guinea, Natal, Fiji, &c. A very pretty and distinct species. SYN. *Arthropteris albo-punctata.*

N. amboinense (Amboynan). *sti.* tufted, 6in. to 8in. long, nearly naked. *fronds* 2ft. or more long, 8in. to 12in. broad; pinnæ spreading, 3in. to 4in. long, ½in. to ⅝in. broad, cut about a quarter down into bluntish, slightly falcate lobes; lower pinnæ shorter, and deflexed. *sori* in rows close to the midrib; capsules naked. Philippines, &c.

N. Arbuscula (little tree).* *sti.* tufted, 4in. to 8in. long. *fronds* 1ft. to 1½ft. long, 6in. to 8in. broad; pinnæ close, numerous, 3in. to 4in. long, ⅝in. to ½in. broad, cut a quarter or less down into blunt lobes, several of the lower pairs short and distant. *sori* in close rows. Mascarene Islands, Ceylon, &c. SYN. *N. Hookeri.*

N. aristatum (awned). A synonym of *N. Otaria.*

N. articulatum (jointed). A synonym of *N. pennigerum.*

N. catopteron (downwards-winged).* *sti.* 3ft. to 4ft. long, pubescent. *fronds* 4ft. to 6ft. long, 2ft. to 3ft. broad; lower pinnæ 1ft. to 1½ft. long, oblong-lanceolate, with close, lanceolate pinnules, or sub-deltoid, with some of the pinnules of the lower side compound; segments oblong, bluntish, about ½in. long, ¼in. broad, more or less deeply pinnatifid. *sori* copious; involucre firm. Cape Colony, &c. Greenhouse.

N. chrysolobum (golden-lobed). *sti.* tufted, 4in. to 6in. long, slender, villose, scaly below. *fronds* 6in. to 9in. long, 3in. to 4in. broad; pinnæ 1½in. to 2in. long, ⅝in. broad, cut down nearly to the rachis into close, blunt, entire lobes, ¼in. broad, the lowest pair deflexed and slightly stalked. *sori* near the apex. Brazil, &c., 1840. A very pretty species, but rarely seen in cultivation. SYN. *Lastrea chrysoloba.*

N. cicutarium (Cicuta-like).* *sti.* 1ft. or more long. *fronds* 1ft. to 2ft. long, sub-deltoid, the apex deeply pinnated, with sinuated lanceolate lobes; below this, three to six pinnæ on each side, the lowest sub-deltoid, deeply pinnatifid or pinnate below. *sori* rather large, in two rows near the main veins, on connected or free veinlets. Tropics of both hemispheres. SYN. *Sagenia cicutaria.*

N. cuspidatum (pointed).* *sti.* 1ft. or more long, naked, densely scaly at the base. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad; pinnæ 4in. to 6in. long, ½in. broad, the edge sharply inciso-serrated to a depth of from half to one line; involucre fugacious. North India, Ceylon.

N. cyatheoides (Cyathea-like).* *sti.* 1ft. to 2ft. long, naked. *fronds* 2ft to 3ft. long, 1ft. or more broad; pinnæ close, spreading, 4in. to 6in. long, ⅜in. to 1in. broad, the apex acuminate, the edge irregular, furnished with acute forward-pointing teeth to a depth of one or two lines, the lowest pair not shorter than the next. *sori* usually one on each veinlet, close to the main vein. Sandwich Islands and Sumatra. A very handsome but rare greenhouse species. (H. S. F. iv. 241A.)

Nephrodium—*continued.*

N. decompositum (decompound).* *rhiz.* wide-creeping. *sti.* 1ft. to 1½ft. long, scaly at base. *fronds* 1ft. to 2ft. long, 1ft. or more broad, ovate-lanceolate or deltoid; lower pinnæ much the largest, deltoid, 4in. to 9in. long, 2in. to 4in. broad; pinnules lanceolate, more or less deeply pinnatifid; segments unequal-sided, ovate-rhomboidal, deeply pinnatifid, with toothed lobes. *sori* rather large, placed midway between the midrib and edge. Australia to Fiji, 1825. A handsome greenhouse species. SYN. *Lastrea decomposita.*

N. d. glabellum (smoothish). *fronds* more finely cut than in the type, with more copious spinulose teeth, villose only on the rachis above, the surfaces glossy, and lobes not imbricated. A very desirable greenhouse form, having an abbreviated rhizome. SYN. *Lastrea glabella.*

N. decurrens (decurrent). *rhiz.* creeping. *sti.* narrowly winged, often nearly or quite to the base. *fronds* 2ft. to 4ft. long, 1ft. or more broad, cut down to a winged rachis into four to eight pairs of sinuated linear-oblong pinnæ, 6in. to 12in. long, 1in. to 2in. broad, the lowest sometimes forked. *sori* large, in two regular rows between the principal veins. Tropical Asia, &c. SYN. *Sagenia decurrens.*

N. decursivo-pinnatum (decursive-pinnate).* *sti.* tufted, 3in. to 4in. long, scaly. *fronds* 1ft. or more long, 3in. to 4in. broad; pinnæ linear, 1in. to 2in. long, ¼in. broad, the edge more or less pinnatifid, the bases connected by a broad lobed wing, the lower one gradually reduced and sometimes distinct; involucre minute, fugacious. Japan, &c. Hardy.

N. deltoideum (deltoid).* *sti.* tufted, 3in. to 6in. long, densely scaly. *fronds* 1ft. to 2ft. long, 4in. to 8in. broad; pinnæ of the lower third or quarter suddenly dwarfed, the larger ones 2in. to 4in. long, ⅜in. to 1in. broad, cut two-thirds of the way down into close entire lobes, two lines broad. *sori* nearer the edge than the midrib; involucre very fugacious. West Indies. A singular and beautiful species. SYN. *Lastrea deltoidea.*

N. dissectum (dissected). *sti.* tufted, 1ft. or more long, rather slender. *fronds* 1ft. to 5ft. long, 1ft. to 3ft. broad, deltoid; lower pinnæ varying from simply pinnatifid, with broad, blunt lobes, to 1ft. long, with similar pinnatifid pinnules, the centre usually uncut for a breadth of ¼in. to ½in., and the uncut bluntish or acute ultimate divisions as broad. *sori* copious, generally submarginal. India, Ceylon, to Madagascar. SYNS. *N. membranifolium, Lastrea dissecta.*

N. eriocarpum (woolly-spored). A synonym of *N. odoratum.*

N. erythrosorum (red-sorused).* *sti.* tufted, 6in. to 9in. long, more or less densely scaly. *fronds* 1ft. to 1½ft. long, 8in. to 12in. broad, ovate-lanceolate; pinnæ lanceolate, the lowest the largest, 5in. to 6in. long, 1½in. broad, cut down to the rachis below into oblong bluntish pinnules, 2in. or 3in. broad, the edge slightly, sometimes spinosely, toothed. *sori* in rows of six to nine to a pinnule, near the midrib; involucre half a line broad, flat, bright red when young. Japan and China. Hardy. SYN. *Lastrea erythrosora.* (H. S. F. iv. 253.)

N. eusorum (large-sorused). A synonym of *N. truncatum.*

N. extensum (extensive). *sti.* 1ft. to 2ft. long. *fronds* 2ft. to 4ft. long, 1ft. to 1½ft. broad; pinnæ 6in. to 9in. long, ⅝in. to ¾in. broad, cut about two-thirds down to the rachis into linear-oblong lobes; lower pinnæ scarcely shorter than the rest. *sori* in rows, nearly terminal in the veins, and not confined to the lobes. Ceylon, Philippines, &c.

N. Filix-mas. Male Fern.* *sti.* tufted, 6in. or more long, more or less densely scaly. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad; pinnæ lanceolate, 4in. to 6in. long, ⅜in. to 1¼in. broad, cut down very nearly to the rachis into close, blunt, regular, sub-entire lobes, one and a-half to two lines broad, lower ones rather shorter than the others; involucre large, convex. Cosmopolitan. SYN. *Lastrea Filix-mas.* Of this very widely-distributed hardy species, the following are the more important varieties.

N. F.-m. abbreviatum cristatum (short-crested). A charming miniature form, growing from 10in. to 1½ft. high, with distant and crested pinnæ.

N. F.-m. acrocladon (branch-tipped). An elegant and distinct form, with fronds 1½ft. or more long, ovate-lanceolate, deep rich green, and having the apex of each pinnæ, as well as the top of the frond, profusely crested.

N. F.-m. Bollandiæ (Mrs. Bolland's). A handsome and distinct form, the fronds of which are from 1ft. to 1½ft. long, 8in. or 9in. wide, thin, and remarkable for their width and undulate appearance.

N. F.-m. crispa (curled). A pretty variety for the Wardian case, having fronds about 9in. long, ovate-lanceolate, with the pinnæ and pinnules crowded and imbricate.

N. F.-m. cristatum (crested).* A handsome variety, having fronds about 2ft. long and 10in. broad, frequently, however, exceeding these dimensions; pinnæ shorter and narrower than in the type; apex of frond and each pinna beautifully tasselled or crested. There is a most desirable form of this variety known as *angustatum*, in which the fronds are only about 2½in. wide.

N. F.-m. furcans (forked). A fine and robust-growing variety, with fronds nearly 2ft. long, and the apex of each pinna forked.

Nephrodium—*continued.*

N. F.-m. grandiceps (large-crested). A lovely plant, having fronds the same length and breadth as the type, but with the apex densely racemose and crested; pinnules frequently forked.

N. F.-m. Pinderi (Pinder's). A well-marked variety, with linear-lanceolate, erect, fronds, which are from 2ft. to 3ft. in length.

N. F.-m. polydactyla (many-fingered). A handsome and graceful plant, with fronds from 1ft. to 2ft. long, having the apex of each pinna, and also of the frond, terminated by a very pretty tuft or crest.

N. F.-m. pumila (dwarf). An elegant little variety, with rich dark green fronds, and pinnatifid, obtuse pinnæ. A pretty plant for Wardian cases.

N. F.-m. Schofieldii (Schofield's). A rare and pretty little variety, having fronds 4in. long and ½in. broad, and with forked or crested apices.

N. floridanum (Floridan).* *sti.* 6in. or more long, with a few scales. *fronds* 1½ft. to 2ft. long, 6in. to 8in. broad, oblong-lanceolate; fertile pinnæ confined to the upper half, close, lanceolate, 3in. to 4in. long, 1in. to 1¼in. broad, cut down to a narrowly-winged rachis into oblong, slightly crenated, blunt pinnules, with their own breadth between them, and two rows of sori reaching from the midrib nearly to the edge; barren pinnæ broader, the lower ones rather reduced, and sub-deltoid, all not so deeply cut, and the pinnules close. South United States. Hardy.

N. fœnisecii (haymaking-time). A synonym of *N. æmulum.*

N. fragrans (fragrant).* *sti.* densely tufted, very short, scaly. *fronds* 6in. to 9in. long, 1½in. to 2in. broad, oblong-lanceolate; pinnæ ⅜in. long, ¼in. to ⅜in. broad, cut down nearly to the rachis below into oblong lobes, which are again toothed or pinnatifid; lower pinnæ reduced gradually. *sori* in the lower part of the pinnules; involucre very large and membranous. Caucasus and Arctic America, &c., 1820. Hardy. See Fig. 676.

N. funestum (deadly). A synonym of *N. subquinquefidum.*

N. glandulosum (glandular).* *sti.* smooth, but slightly scaly when young. *fronds* glabrous, pinnate, 2ft. to 3ft. long; pinnæ distant, ovate-lanceolate, shortly petiolate, sub-cordate at base, and crenate at margin; lower ones almost opposite, upper ones alternate. *sori* small, reniform. India, &c.

N. Goldieanum (Goldie's).* *sti.* tufted, 1ft. long, scaly below. *fronds* 2ft. to 3ft. long, 1ft. or more broad, ovate-deltoid; lower pinnæ 6in. to 9in. long, 2in. broad, cut down nearly to the rachis into linear-lanceolate, sub-falcate, slightly-toothed lobes. *sori* in rows near the midrib. North America. Hardy.

N. hirsutum (hairy), of Don. A synonym of *N. odoratum.*

FIG. 676. NEPHRODIUM FRAGRANS.

N. hirtipes (hairy-stalked). *sti.* tufted, 1ft. or more long, densely scaly. *fronds* 2ft. to 3ft. long, 8in. to 16in. broad; pinnæ 4in. to 8in. long, about ⅜in. broad, with broad blunt lobes reaching from a quarter to a third down, lower ones not reduced. *sori* medial.

Nephrodium—*continued.*

Himalayas, &c. A hardy species, in general habit resembling *N. Filix-mas.* (H. S. F. iv. 249.)

N. hispidum (hispid).* *rhiz.* stout, creeping. *sti.* 1ft. to 1½ft. long, densely scaly. *fronds* 1ft. to 1½ft. long, 8in. to 12in. broad, sub-deltoid; pinnæ lanceolate, the lowest deltoid; lowest pinnules larger than the others, which are lanceolate, with lanceolate segments cut down to a winged rachis into small, oblong or linear, sharply-toothed lobes. *sori* copious. New Zealand, &c. A very handsome little greenhouse species.

N. Hookeri (Hooker's). A synonym of *N. Arbuscula.*

FIG. 677. NEPHRODIUM LEUZEANUM, showing Habit and detached Pinnule.

N. Hudsonianum (Hudson's). A synonym of *N. truncatum.*

N. inæquale (unequal).* *sti.* 1ft. or more long, with a dense tuft of reddish-brown scales at the base. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad, ovate-deltoid; lower pinnæ rather shorter and broader than the next, which are 6in. to 8in. long, 2in. to 3in. broad; pinnules lanceolate, cut down nearly to the rachis into oblong spinose-serrated segments. *sori* in two rows near the midrib; involucre firm, naked. Cape Colony and Natal. Greenhouse.

N. intermedium (intermediate). *sti.* 1ft. to 2ft. long, densely fibrillose at the base. *fronds* 2ft. to 3ft. long, 1ft. to 1½ft. broad, sub-deltoid; lower pinnæ lanceolate, often 1ft. long, 4in. to 5in. broad; pinnules close, lanceolate, having distinct oblong-lanceolate segments, with ligulate sub-entire lobes, about one 1in. broad. *sori* small, copious, nearer the midrib than the edge; involucre thin, fugacious. North India, Japan, &c. Greenhouse.

N. invisum (unseen). *rhiz.* stout, wide-creeping. *sti.* 1ft. or more long, stout, villose. *fronds* 1½ft. to 2ft. long, 8in. to 12in. broad; pinnæ numerous, 4in. or 5in. long, ½in. broad, cut about one-third down into sharp, triangular, falcate lobes; lower pinnæ distant and dwarfed. *sori* in rows close to the midrib; capsules setose. Polynesian Islands, 1830. SYN. *Lastrea invisa.*

N. Kaulfussii (Kaulfuss's). *sti.* tufted, 4in. to 6in. long, slender, slightly pubescent. *fronds* 1½ft. to 2ft. long, 6in. to 8in. broad, oblong-lanceolate; pinnæ 3in. to 4in. long, ½in. to ⅝in. broad, cut down nearly to the rachis into spreading, entire, blunt lobes, two lines broad, the lower ones not enlarged, and the lower pinnæ dwindling down gradually. *sori* medial; involucre fugacious. West Indies to Brazil.

N. Leuzeanum (Leuze's).* *cau.* sub-arborescent, densely scaly at the crown. *sti.* 2ft. to 3ft. long, stout, striated. *fronds* 4ft. to 6ft. long, sub-deltoid; pinnæ 1ft. to 1½ft. long, 6in. to 8in. broad, simple, or the lowest with two or three large pinnated pinnules from the lower side; segments 3in. to 4in. long, ⅜in. to 1½in. broad, with oblong, sub-falcate, entire, or sinuated lobes reaching down to a broadly-winged rachis. *sori* copious, usually in close single rows in the lobes. North India to Fiji, 1874. SYN. *Pleocnemia Leuzeana.* See Fig. 677.

N. marginale (marginal-spored). *sti.* tufted, 6in. to 12in. long, with large concolorous scales at the base. *fronds* 18in. to 24in. long, 6in. to 8in. broad, oblong-lanceolate, bipinnate; pinnæ 3in. to 4in. long, 1in. to 1½in. broad; pinnules ovate-oblong, blunt, nearly entire. *sori* marginal. North America, 1772. Hardy.

N. membranifolium (membranous-fronded). A synonym of *N. dissectum.*

N. molle (soft).* *sti.* tufted, 1ft. or more long, rather slender, hairy. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad; pinnæ spread-

Nephrodium—*continued.*

ing, 4in. to 6in. long, ¾in. broad, cut about half-way down to the midrib into scarcely falcate, blunt lobes; the lower pinnæ distant, and rather shorter than the others. *sori* distant from the midrib; capsules naked. Tropics, 1820. A well-known and very variable species, of which the following are varieties:

FIG. 678. NEPHRODIUM MOLLE CORYMBIFERUM, showing Habit and Portions of detached Frond.

N. m. corymbiferum (corymb-bearing).* A most interesting and desirable plant, erect in habit, producing branched fronds, 1ft. to 2ft. long; the top of each frond or branch has a large crest or corymb, and the ends of the pinnæ are similarly furnished, but on a smaller scale. See Fig. 678.

FIG. 679. PORTION OF FROND OF NEPHRODIUM MOLLE GRANDICEPS.

N. m. grandiceps (large-crested). A garden variety, with a large terminal crest, and the pinnæ also conspicuously crested. See Fig. 679.

Nephrodium—*continued.*

N. montanum (mountain). Mountain Buckler Fern. *sti.* short, tufted. *fronds* 1½ft. to 2ft. long, 6in. to 8in. broad; pinnæ 3in. to 4in. long, 1in. broad at the base, cut down to a broadly-winged rachis into close, blunt, oblong lobes; lower pinnæ distant, and gradually dwarfed down to mere auricles. *sori* in rows near the edge. Europe (Britain), &c. SYN. *Lastrea montana.* The following are the more important varieties of this hardy species:

N. m. cristata (crested).* A rare and beautiful fragrant variety, in which the fronds are nearly as large as those of the type, but with the apex very finely crested or tasselled; the tips of the pinnæ are similarly furnished, but on a smaller scale.

N. m. Nowelliana (Nowell's). A very distinct variety, having the fronds from 1ft. to 1½ft. long, and 4in. or 5in. in width, pinnate, with narrow pinnæ, and the lobes much abbreviated and erose.

N. m. truncata (truncated). A very curious and rare form, with præmorse pinnæ.

N. noveboracense (New York). *rhiz.* slender, wide-creeping. *sti.* 1ft. long, stramineous. *fronds* 1ft. to 2ft. long, 4in. to 6in. broad; pinnæ spreading, 2in. to 3in. long, ½in. broad, cut down very nearly to the rachis into linear-oblong lobes, those of the barren frond the broadest; lower pinnæ small, deflexed. *sori* soon confluent, in the rows near the flat edge. North America, 1812. Hardy.

N. odoratum (fragrant). *sti.* 1ft. to 1½ft. long, densely scaly at the base. *fronds* 9in. to 18in. long, deltoid; lowest pinnæ much the largest, deltoid, 6in. to 9in. long, 3in. to 4in. broad; pinnules lanceolate, often imbricated, with ovate or oblong pinnatifid segments, with blunt rounded lobes. *sori* copious. Involucres large, pale, villous. Tropical Asia, &c. SYNS. *N. eriocarpum* and *N. hirsutum.*

N. Otaria (Otaria). *sti.* 6in. to 12in. long. *fronds* 1ft. or more long, with a linear-oblong terminal pinna, 4in. to 6in. long, 1in. to 1½in. broad, the apex acuminate, the margin with finely serrated lanceolate lobes reaching a quarter or a third of the way down, and from three to six distant spreading similar lateral ones on each side, the lower ones stalked. *sori* one on each veinlet. Philippines, &c. SYN. *N. aristatum.* (H. S. F. iv. 238.)

N. pallidivenium (pale-veined). *sti.* 1ft. or more long, naked or nearly so. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad; pinnæ 4in. to 6in. long, ¾in. to 1in. broad, cut two-thirds of the way down to the rachis into linear-oblong, slightly falcate lobes; lower pinnæ not much smaller than the rest. *sori* small, in close rows about midway between the midrib and edge. Guinea Coast.

N. palustre (marsh-loving). *sti.* 1ft. or more long, naked. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad; pinnæ close, erecto-patent, 4in. to 6in. long, ¾in. broad, cut down nearly to the rachis into linear oblong, entire, slightly falcate lobes, ¼in. broad. *sori* filling up the greater part of the space between midrib and edge; involucre small, ciliated. Brazil.

N. patens (spreading).* *rhiz.* oblique. *sti.* 1ft. or more long, naked or slightly pubescent. *fronds* 2ft. to 3ft. long, 8in. to 12in. broad; pinnæ 4in. to 9in. long, ¼in. to ¾in. broad, cut down about three-quarters of the space to the rachis into linear-oblong, subfalcate lobes. *sori* nearer the edge than the midrib. Involucre persistent. Tropics, &c. A distinct and strong-growing species.

N. p. cristata (crested). A garden form, with the pinnæ curiously forked and crested. See Fig. 680.

N. pennigerum (winged). *sti.* tufted, stout, 8in. to 12in. long, villose. *fronds* 2ft. to 4ft. long, 1ft. to 1½ft. broad; pinnæ numerous, spreading, 6in. to 9in. long, 1in. to 1½in. broad, the apex acuminate, the edge cut above a quarter of the way down to the midrib into oblong, falcate lobes, the lower pinnæ dwarfed and distant. *sori* medial; capsules setose. Himalayas, &c. SYN. *N. articulatum.*

N. podophyllum (footstalk-fronded). *sti.* tufted, 1ft. long, naked upwards. *fronds* 1ft. to 1½ft. long, 8in. to 12in. broad; pinnæ four to eight on each side, erecto-patent, 4in. to 6in. long, 3in. to 12in. broad, the edge nearly entire, or with shallow, broad, blunt lobes; veins pinnate in the lobes, having two to four veinlets on a side, with sometimes a sorus on each, distant from the main vein. Japan and Hong Kong. Greenhouse, or nearly hardy.

N. pteroides (Pteris-like).* *sti.* 1ft. to 2ft. long, slender, slightly scaly below. *fronds* 2ft. to 4ft. long, 1ft. or more broad; pinnæ spreading, 4in. to 8in. long, ¾in. broad, the apex acuminate, the edge cut one-third or half-way down into oblong or subtriangular lobes. *sori* quite marginal, and confined to the lobes. Tropical Asia, &c. A distinct and handsome species.

N. pubescens (downy). *sti.* 6in. to 18in. long, slender, villose. *fronds* 6in. to 18in. long, deltoid; lower pinnæ much the largest; pinnules lanceolate; lower segments usually free, oblong-rhomboidal, unequal-sided. *sori* small, distant from the midrib. West Indies. SYN. *Phegopteris villosa.*

N. purpurascens (purplish). A synonym of *N. sparsum.*

N. Raddianum (Raddi's). A synonym of *N. vestitum.*

N. refractum (curved-back). *sti.* tufted, 1ft. long. *fronds* 1ft. to 1½ft. long, 6in. to 9in. broad; pinnæ growing gradually less

Nephrodium—*continued.*

from near the bottom to the top, the lower ones deflexed, 4in. to 5in. long, ⅜in. broad, the lowest pairs very much so; lobes broad and blunt, reaching about a quarter of the way down to the midrib. *sori* medial; involucre minute, fugacious. Brazil. (H. S. F. iv. 252.)

Nephrodium—*continued.*

slightly pilose. New Caledonia. Greenhouse. SYN. *Lastrea Richardsi.*

N. rigidum (rigid).* *sti.* tufted, 6in. long, densely scaly below. *fronds* 1ft. to 1¼ft. long, 4in. to 6in. broad, oblong-lanceolate; largest pinnæ 2in. to 3in. long, 1in. to 1½in. broad, the pinnules of

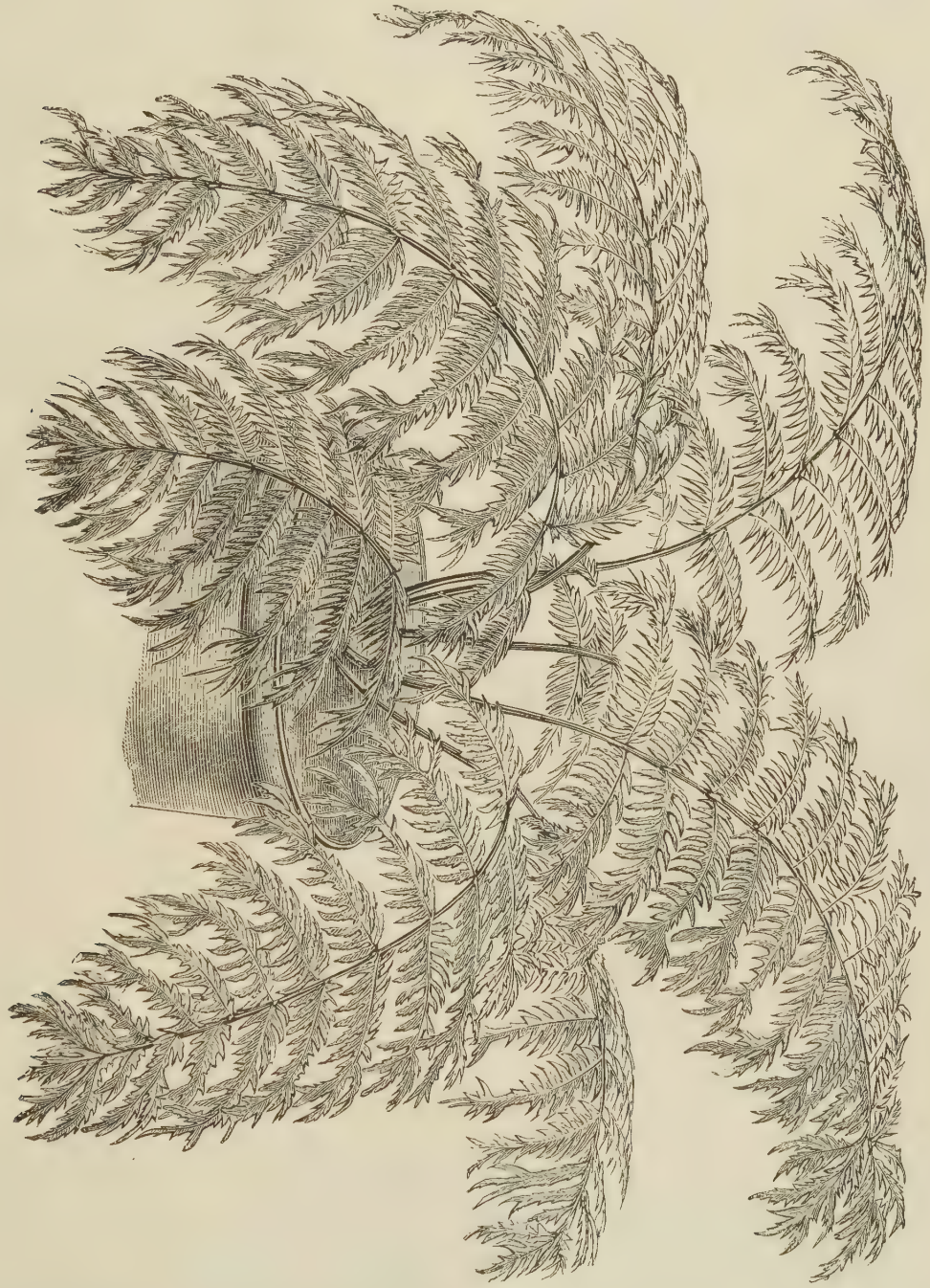


FIG. 680. NEPHRODIUM PATENS CRISTATA.

N. Richardsi (Richards's). *fronds* oblong-lanceolate, bipinnatifid, 1¼ft. to 1½ft. long, 8in. to 9in. broad; pinnæ moderately close, patent, ligulate-caudate, ⅜in. broad, cut down to a narrow wing into close, ligulate, slightly repand, blunt lobes, one line broad; lowest pinnæ not reduced, their lowest lobes on both sides slightly so. *sori* medial; involucre firm, persistent, the lower half free, ovate-rhomboidal, cut down nearly to the rachis below. *sori* close to the midrib; involucre firm, prominent, fringed with glands. Europe (Britain), Asia Minor, North America. Hardy.

N. sanctum (sacred). *sti.* densely tufted, slender, 2in. to 3in. long, naked upwards. *fronds* 6in. to 9in. long, 1in. to 2in. broad,

Nephrodium—*continued.*

lanceolate; pinnæ distant, ½in. to 1in. long, 1½in. to 3in. broad, the point bluntish, the edge more or less deeply pinnatifid; the lobes sometimes close and linear-oblong, sometimes distinct, linear or spathulate. *sori* minute; involucre very fugacious. West Indies, &c. SYN. *Lastrea sancta.*

N. Sieboldii (Siebold's).* *cau.* tufted, scaly. *sti.* 6in. to 12in. long, scaly below. *fronds* with an entire or slightly toothed, lanceolate-oblong, terminal pinna, 8in. to 12in. long, and 1½in. to 2in. broad, and from two to four similar ones on each side, the lowest shortly stalked. *sori* large, copious, scattered. Japan. Greenhouse, or nearly hardy. SYN. *Pycnopteris Sieboldii.*

N. sophoroides (Sophora-like). *sti.* 1ft. or more long, slender, pubescent. *fronds* 1ft. to 2ft. long, 6in. to 9in. broad; pinnæ spreading, 4in. to 6in. long, ½in. to ¾in. broad, apex acuminate, the edge cut one-third the way down into oblong-triangular, subfalcate lobes. Japan, &c. Greenhouse.

N. sparsum (scattered). *sti.* tufted, 6in. to 12in. long, scaly only at base. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad, ovate-lanceolate; lowest pinnæ the largest, 4in. to 6in. long, 1½in. to 2in. broad; lowest pinnules sometimes compound, the others lanceolate, unequal-sided, pinnatifid, with oblong, blunt lobes. *sori* usually one to each lobe, near the midrib; involucre naked, flat, one line broad. North India to Mauritius. A noble greenhouse species. SYN. *N. purpurascens.* (H. S. F. iv. 262.)

N. spinulosum (rather spiny).* *sti.* tufted, about 1ft. long, scaly. *fronds* 1ft. to 1½ft. long, 6in. to 8in. broad, oblong-lanceolate; lower pinnæ sub-deltoid, 3in. to 4in. long, 1½in. to 2in. broad, the lowest pair about equal to the next; pinnules ovate-lanceolate, the largest about 1in. long, ½in. broad, cut down to the rachis below into close oblong lobes, with copious aristate teeth; involucre not gland-ciliated. Europe (Britain), Africa, North-east Asia, and North America. Hardy. The following are the most important varieties:

N. s. dilatatum (enlarged-crested).* Scales denser and narrower than those of the type, dark brown in the centre. *fronds* ovate-lanceolate or sub-deltoid, larger and more deeply cut, the colour darker, the pinnæ closer, and the under surface often finely glandular; involucre gland-ciliated. SYN. *Lastrea dilatata.*

N. s. lepidota (scaly). Rachises chestnut-brown, scaly. *fronds* sub-deltoid; lower pinnæ deltoid, 5in. to 6in. each way; lowest pinnules much the largest, often 3in. long, 2in. broad; its segments cut down to the rachis below, and with lobes again deeply pinnatifid.

N. s. remotum (remote). *fronds* oblong-lanceolate, about 2ft. long, 6in. broad; pinnæ lanceolate, close; pinnules ovate-oblong, only the lowest free, the largest about 1in. long, ½in. broad, cut half-way down to the rachis or more; spinulose teeth few; under side and involucre not glanduiar.

Mr. B. S. Williams describes the following varieties as forms of *Lastrea dilatata*: *angustipinnula*, a pretty and distinct form, having fronds about 1¾ft. long and 9in. wide, with somewhat distant pinnæ and very irregular pinnules. *Chanteriæ*, a distinct form, with bi-pinnate lanceolate fronds, 1ft. to 2ft. long, and 8in. to 9in. wide, diminishing towards the apex; pinnæ distant; pinnules very obtuse and dentate. *dumetorum*, a very desirable plant, the fronds of which have a peculiar undulating surface, and rarely exceed 1ft. in length. *Stansfieldii*, a very beautiful subject, with fronds 6in. to 12in. long and 4in. broad, ovate-lanceolate; pinnæ obtuse; pinnules deeply serrated on the margins, and curled.

N. subquinquefidum (somewhat five-cut). *sti.* 1ft. or more long, firm. *fronds* 6in. to 18in. each way; lower pinnæ much the largest, with the pinnules on the lower side much larger than the others, which are from 1in. to 3in. broad, often cut down nearly to the rachis below into broad, oblong lobes. *sori* medial. West Indies to Brazil, tropical Africa. SYNS. *N. funestum* (H. S. F. iv. 259), *N. Vogelii*, and *Lastrea pilosissima.*

N. Thelypteris (Thelypteris). *rhiz.* slender, wide-creeping. *sti.* about 1ft. long, slender. *fronds* 1ft. to 2ft. long, 4in. to 6in. broad; pinnæ spreading, 2in. to 3in. long, ½in. broad, cut down very nearly to the rachis into entire, spreading, linear-oblong lobes, those of the barren frond the broadest; lower pinnæ equalling the others. *sori* small, not confluent, in rows near the recurved edge. Europe (Britain), Asia, Africa, North America, New Zealand, &c. A very distinct hardy species.

N. truncatum (truncate). *sti.* tufted, stout, erect, 2ft. long, naked or slightly villose. *fronds* 2ft. to 4ft. long, 1ft. to 1½ft. broad; pinnæ 6in. to 9in. long, 1in. broad, cut down one-third or more of the distance to the rachis into blunt, spreading, oblong lobes; lower pinnæ small. *sori* one on each veinlet, near the main vein. North India, Australia, &c., 1869. A very fine but rare greenhouse species. SYNS. *N. abruptum* (H. S. F. iv. 241B), *N. eusorum*, and *N. Hudsonianum.*

Nephrodium—*continued.*

N. unitum (joined). *sti.* 1ft. to 1½ft. long, naked. *fronds* 2ft. or more long, 6in. to 8in. broad; pinnæ 4in. to 5in. long, ½in. broad, the edge cut from one-third to half-way down into spreading, triangular, sharp-pointed lobes; lower pinnæ not dwindling down. *sori* near the extremity, principally in the lobes; capsules naked. Florida and West Indies, to Brazil, &c. A fine, tall-growing species.

N. venulosum (veined). *sti.* 1½ft. long, naked, greyish, sharply angled. *fronds* 4ft. long, 1ft. to 1½ft. broad; pinnæ numerous, the lowest short and very distant, the largest 8in. to 9in. long, 1in. broad, cut down half-way to the rachis into slightly-toothed, oblong lobes; veins about nine on each side, conspicuous above, with a sorus on each midway to the edge. Fernando Po.

N. venustum (charming).* *sti.* tufted, 1ft. or more long, naked. *fronds* 2ft. or more long, 1ft. broad; pinnæ numerous, spreading, 6in. long, 1in. broad, with blunt, oblong lobes, reaching half-way down. *sori* principally in the lobes, close to the edge. Jamaica. A handsome species. (G. C. 1855, 677.)

N. vestitum (clothed).* *sti.* 6in. to 12in. long, stout, densely scaly. *fronds* 1ft. to 2ft. long, 6in. to 10in. broad; pinnæ 3in. to 5in. long, ¾in. to 1in. broad, cut down to a narrowly-winged rachis into blunt, entire, falcate lobes, two lines broad. *sori* close to the midrib. South Brazil. A handsome species. SYNS. *N. Raddianum* and *Lastrea vestita.*

N. villosum (villose).* *sti.* tufted, 2ft. to 3ft. or more long, stout, usually villose and densely scaly. *fronds* 4ft. to 6ft. or more long, 2ft. to 3ft. or more broad; pinnæ often 2ft. long, 1ft. broad; pinnules lanceolate, cut down to the rachis into close, oblong, pinnatifid segments; largest entire lobes ¾in. long, ⅛in. broad. *sori* copious; involucre flat, half a line broad, often suppressed. West Indies, to Peru and Chili, 1793. A fine species. (H. S. F. iv. 264.)

N. Vogelli (Vogel's). A synonym of *N. subquinquefidum.*

NEPHROLEPIS (from *nephros*, a kidney, and *lepis*, a scale; referring to the covering of the sori). Including *Arthropteris* (in part). ORD. *Filices.* A small genus (ten species) of very handsome stove Ferns, widely dispersed over the tropical parts of the globe. Fronds simply pinnate, with the pinnæ articulated at the base,

FIG. 681. NEPHROLEPIS DAVALLIOIDES, showing Habit and Portion of detached Frond

and often very deciduous in the dried plant, with white cretaceous dots on the upper surface. Sori round, arising from the apex of the upper branch of a rim, generally near the edge; involucre reniform or roundish. Veins in all free. Several species are well adapted for growing in suspended baskets; they do very well in a compost of peat, loam, and sand, with an abundant supply of water. For general culture, *see* **Ferns.**

N. acuta (acute). *sti.* tufted, 4in. to 8in. long, firm, naked, or slightly scaly. *fronds* 2ft. to 4ft. long, 8in. to 12in. broad; pinnæ 4in. to 8in. long, ½in. to 1in. broad, acute, the edge entire or slightly crenate, the upper side auricled, the lower rounded at the base. *sori* sub-marginal. Involucre sub-orbicular, sub-

Nephrolepis—*continued.*

peltate. SYNS. *N. biserrata, N. ensifolia, N. punctulata,* and *N. splendens.*

N. biserrata (twice-serrated). A synonym of *N. acuta.*

N. cordifolia (cordate-fronded).* *cau.* sub-erect or oblique, the wiry fibres often bearing tubers. *sti.* tufted, wiry, 1in. to 4in. long, scaly. *fronds* 1ft. to 2ft. long, 1½in. to 2in broad; pinnæ close, often imbricated, about 1in. long, ¼in. to ⅜in. broad, usually blunt, the edge entire or slightly crenate, the under side rounded or crenate, the upper distinctly auricled at the base. *sori* in a row about midway between the midrib and edge; involucre firm, distinctly reniform, oblique, or opening towards the outer edge. Tropical America, 1841. A handsome species. SYN. *N. tuberosa.*

Nephrolepis—*continued.*

N. d. furcans (forked). A beautiful and distinct crested variety, of robust growth, sending forth numerous arching fronds from 3ft. to 4ft. long, and, both in habit and general appearance, a great improvement on the type. See Fig. 682, for which we are indebted to Messrs. W. and J. Birkenhead.

N. Duffii (Duff's).* *sti.* 6in. to 8in. long. *fronds* about 2ft. long, tufted, pinnate, narrow-linear, the apex multifidly forked; tip of frond two or three times forked, the tips of the branches again shortly divided; pinnæ small, rounded or flabellate, twin, overlapping each other, crenate at the edge. *sori* absent. Duke of York Island, 1878. A very elegant species, having fascicles of numerous gracefully-arching fronds. See Fig. 683. (G. C. n. s., ix. 623.)

FIG. 682. PORTION OF FROND AND DETACHED PINNA OF NEPHROLEPIS DAVALLIOIDES FURCANS.

N. c. pectinata (comb-like). A variety of the preceding, producing no tubers. Stem and rachis naked; pinnæ less distinctly auricled at the base on the upper, obliquely truncate on the lower, side. SYN. *N. pectinata.*

N. davallioides (Davallia-like).* *cau.* short, stoloniferous. *sti.* tufted, 1ft. or more long, scaly towards the base. *fronds* drooping, 2ft. to 3ft. long, 1ft. or more broad; lower pinnæ barren, 4in. to 8in. long, ¼in. to 1in. broad, the apex acuminate, the edge inciso-crenate to a depth of one line or less; fertile pinnæ narrower, the lobes deeper, and bearing each a single sorus at the point. Involucre reniform. Malaya, 1852. A beautiful species, probably the handsomest of the genus, and easily distinguished by its pinnatifid fertile pinnæ, with the sori at the tip of the lobes. See Fig. 681. (G. C. 1855, 388.)

N. ensifolia (sword-fronded). A synonym of *N. acuta.*

N. exaltata (lofty). *sti.* tufted, 4in. to 6in. long, firm, naked, or slightly scaly. *fronds* 1ft. to 2ft. or more long, 3in. 6in. to broad; pinnæ close, 1½in. to 3in. long, ¼in. to ½in. broad, usually acute, the edge entire or slightly crenate; the upper side auricled, the lower rounded at the base. *sori* sub-marginal; involucre firm, distinctly reniform. Tropics, 1793. To this well-known and desirable species Mr. J. G. Baker refers *N. volubilis.*

N. e. hirsutula (small-haired). A variety with the rachis densely, and both surfaces more or less, coated with ferruginous down. SYN. *N. hirsutula.*

N. falciformis (sickle-formed). *fronds* 1½ft. to 2ft. long, sub-erect, linear; pinnæ numerous; lower (sterile) ones elliptical,

Nephrolepis—*continued.*

obtuse, truncate at base; superior (fertile) ones lanceolate-falcate, acute, sub-deflexed, 1½in. long, ⅛in. wide, truncate at base, sub-auriculate on the upper margin. *sori* uniserial, anti-marginal. Borneo.

N. hirsutula (small-haired). A synonym of *N. exaltata hirsutula.*

N. obliterata (obliterated). A synonym of *N. ramosa.*

N. pectinata (comb-like) A synonym of *N. cordifolia pectinata.*

FIG. 683. NEPHROLEPIS DUFFII, showing Habit and Portion of detached Frond.

N. pluma (feather).* *fronds* 4ft. to 5ft. long, 4in. broad, linear, pendulous, pinnate; pinnæ about 2in. long, articulated with the rachis, usually falcately nerved, broadest at the cordate base, the margin thickened, nearly entire towards the base, and notched upwards in a series of oblique crenatures. *sori* transversely set at the end of the anterior venule of each fascicle, one to each crenature. Madagascar, 1878. A very handsome greenhouse species, with wiry stolons. (G. C. n. s., ix. 589.)

N. punctulata (small-dotted). A synonym of *N. acuta.*

N. ramosa (branched). *sti.* very short, scattered, on a slender, wiry, wide-creeping rhizome. *fronds* 6in. to 12in. long, 1in. to 3in. broad; pinnæ ⅛in. to 1½in. long, ¼in. to ⅓in. broad, slightly crenate, the upper edge auricled and truncate, parallel with the stem, the lower oblique; involucre roundish, very fugacious. Tropics of Old World. SYNS. *N. obliterata* and *N. trichomanoides.*

N. splendens (glittering). A synonym of *N. acuta.*

N. trichomanoides (Trichomanes-like). A synonym of *N. ramosa.*

N. tuberosa (tuberous). A synonym of *N. cordifolia.*

N. volubilis (twining). A straggling, flexuous form of *N. exaltata.*

NEPHROSPERMA (from *nephros*, a kidney, and *sperma*, a seed; referring to the shape of the seed). ORD. *Palmæ.* A monotypic genus, the species being a very elegant, armed, stove Palm, thriving in a compost of turfy loam, leaf mould, and sand. Care should be taken not to overpot, for when grown with but limited root room, and plentifully supplied with water, the plants are very useful for decorative purposes in a young state.

N. Van Houtteanum (Van Houtte's).* *fl.* large. *l.* pinnate, gracefully arched, divided into rather broad and long pendulous, acuminate, unequal segments; petioles rather short. *h.* 20ft. to 35ft. Seychelles, &c., 1868. SYNS. *Areca nobilis* and *Oncosperma Van Houtteanum.*

NEPHTHYTIS (named after Nephthys, the mother of Anubis, the wife of Typhon). ORD. *Aroideæ* (*Araceæ*). This genus contains but three species of tall herbs, chiefly of botanical interest, and natives of Western tropical Africa. Spathes membranous, elliptic, acute;

Nephthytis—*continued.*

spadix shorter than the spathe; peduncle slender, erect. Leaves large, on long petioles, membranous, triangularly sagittate. *N. liberica* and *N. constricta* are stove perennials, the second species not being worthy of special mention. The species thrive in a hot, moist atmosphere, and like a light, well-drained soil, rich in humus. Plenty of water at the roots during the season of growth is essential.

N. liberica (Liberian). *fl.*, spathe concave, expanded, ovate-oblong, shortly cuspidate, 2½in. long, green; spadix shorter than the spathe; scape terminal, overtopping the leaves. *l.* on long petioles, sagittate, bright green. Stem subscandent. Liberia, 1881.

NEPTUNIA (so called after Neptune, god of the sea; in reference to the species growing in lakes and ponds). ORD. *Leguminosæ.* A genus comprising about eight species of diffuse, prostrate, or floating perennial herbs or sub-shrubs, inhabiting North and South America, tropical Asia, and Australia. Flowers in globular heads, the lower ones barren, with elongated petals; the upper ones fertile, with definite stamens, as in *Desmanthus.* Leaves bipinnate; leaflets small. *N. plena*, the only species yet introduced, thrives well in a stove aquarium, or in tubs or pans filled with water, having a few inches of soil in the bottom. The white, spongy, lower portion of the stems, full of air-cells, enabling the plant to float, are very remarkable. The leaflets and petioles are as irritable as those of *Mimosa pudica*, and are of an extremely delicate yellow-green colour.

N. plena (abounding). *fl.* pale yellow; peduncles bracteate. July to September. *l.* with two to four pairs of pinnæ, and each pinna bearing twelve pairs of leaflets. Stems prostrate, compressed. Tropics, 1733. Sub-shrub. (B. M. 4695.)

NERINE (called after the water nymph of that name). SYN. *Loxanthes.* ORD. *Amaryllideæ.* A genus comprising not more than ten distinct species of beautiful greenhouse or nearly hardy, bulbous plants, indigenous to South Africa. Flowers showy, in many-flowered umbels, erect or slightly declinate; perianth segments narrow, slightly erect at base, spreading or recurved; scape stout. Leaves loriform, sometimes rather broad, appearing with or after the flowers. When in flower, Nerines are amongst the most beautiful of greenhouse bulbous plants. They are propagated from offsets, and these should be grown on under the same treatment as established bulbs. Loam and leaf soil, with charcoal or sharp sand added, is a good compost to use, and efficient drainage must be provided. The periods for growing and resting must be annually allowed with these, as with most other South African bulbs. The Guernsey Lily (*N. sarniensis*) is a beautiful, well-known species, which may be purchased in August, when the flower scapes are just appearing. As the bulbs have for some time previously been kept quite dry, they should be very gradually subjected to watering. *N. curvifolia* is also an exceedingly beautiful species, and one of the most vigorous growers. Nerines do not require repotting very frequently, but an annual top-dressing of new soil is of material advantage when the flowering season begins. This is chiefly autumn and winter, but varies somewhat with different species, according to their habit of flowering before or after the leaves appear. During the season of growth, the plants succeed best in a frame on a dung bed, with a little bottom heat. When the

Nerine—*continued.*

leaves die, store the plants away in a cool place, and keep the soil quite dry, until signs of growth are again apparent.

N. curvifolia (curved-leaved).* *fl.* bright glittering scarlet, scentless, in a many-flowered convex umbel; perianth regular, with the segments slightly cohering at base. Blossoms at various seasons. *l.* glaucous, oblong-linear, or thong-shaped, depressed along the middle. 1788. (A. B. R. 163, under name of *Amaryllis Fothergillia*; B. M. 725, under name of *A. curvifolia.*)

N. filifolia (thread-leaved). *fl.*, perianth rose-red, 1in. long; umbel centripetal, eight to ten-flowered; pedicels densely glandular, pubescent; scape 1ft. long. October. *l.* six to ten from a bulb, slender, 6in. to 8in. long. (B. M. 6547.)

N. flexuosa (zigzag).* *fl.* of a vivid crimson-scarlet, slightly tinged with orange, umbellate. *l.* lighter green, and less glaucous than in *N. sarniensis corusca*. *h.* 1ft. 1795. (B. R. 172, under name of *Amaryllis flexuosa.*)

N. f. excellens (excelling).* *fl.* bright rosy-pink, with a carmine-crimson rib down the centre of each reflexed segment; umbels many-flowered. 1883. A beautiful variety, of very free-flowering habit.

N. f. pulchella (pretty).* *fl.* about seven; perianth pale pink, striped with red; style and filaments white; spathe reddish; scape over 2ft. high. July. *l.* over ¼in. wide, glaucous. 1820. (B. M. 2407.)

N. humilis (dwarf). *fl.* purplish-rose, variegated with paler tints, scentless, in a six to twenty-flowered umbel; perianth segments scarcely cohering; scape longer than the leaves. Late summer. *l.* oblong-linear, somewhat channelled, rounded at the points. (B. M. 726, under name of *Amaryllis humilis.*)

N. japonica. *See* **Lycoris radiata.**

N. Plantii (Plant's). A synonym of *N. sarniensis Plantii.*

N. pudica (chaste). *fl.* six to eight, 1½in. to 2in. long; perianth pure white, streaked with red; scape exceeding the leaves. October. *l.* 6in. to 8in. long, about ¼in. wide, narrow-linear, obtuse, not keeled or ribbed. (B. M. 5901.)

N. sarniensis (Guernsey).* Guernsey Lily. *fl.* pale salmon-coloured; perianth segments recurved at the extremity; scape from 2ft. to 2½ft. high, many-flowered. Autumn. *l.* appearing after the flowers. 1680. (B. M. 294, under name of *Amaryllis sarniensis.*)

N. s. corusca (glittering).* *fl.* brilliant orange-scarlet, very large, about thirty on a strong scape. *l.* broad, oblong, entire. *h.* 1ft. 1809. (B. M. 1089, under name of *Amaryllis corusca.*) A sub-variety, known in gardens as *major*, has pale orange-scarlet coloured flowers, and much narrower segments, which are scarcely so much recurved at the extremities as in the type.

N. s. Plantii (Plant's). This differs from the type in the colour of the flower being a duller crimson, in the longer peduncle, and in the more distinctly unguiculated perianth segments. Possibly a hybrid between *N. sarniensis* and *N. flexuosa.* (Gn. March 25, 1882, under name of *N. Plantii.*)

N. s. venusta (charming).* *fl.* fiery scarlet, in large umbels. June. 1806. A beautiful variety, flowering at the same time as the type. (B. M. 1090, under name of *Amaryllis venusta.*)

FIG. 684. INFLORESCENCE OF NERINE UNDULATA.

N. undulata (wavy-flowered).* *fl.* soft flesh-colour, with the segments of a wavy or undulating outline; scape about 1ft. high, many-flowered. May. *l.* narrow-ligulate or strap-shaped, pale green, generally preceding the flowers. 1767. See Fig. 684. (B. M. 369, under name of *Amaryllis undulata.*)

NERISSA. Included under *Hæmanthus.*

NERIUM (the old Greek name used by Dioscorides, from *neros*, humid; referring to the habit of the species). Oleander. ORD. *Apocynaceæ.* A small genus (two or three species) of very ornamental, erect, greenhouse shrubs, natives of the Mediterranean region and sub-tropical Asia, extending to Japan. Flowers showy, in terminal, shortly pedicellate racemose cymes; corolla pink, white, or yellowish, funnel-shaped; throat crowned by toothed or lacerated segments; lobes five. Leaves three, or rarely four, in a whorl, very rarely opposite, narrow, coriaceous. The leaves are fatal to animals (horses, &c.); the flowers have caused death to those who carelessly picked and ate them, and it is on record that the branches, divested of their bark, and used as skewers, have poisoned the meat roasted on them, and killed seven of twelve people who partook of it. Good plants of Neriums are not unattractive, even when out of flower, on account of their pointed evergreen foliage. The flowers are only produced on mature, well-ripened shoots; consequently, the plants must be well exposed to sun and air throughout their period of growth, which is spring and early summer; the flowers appear later in the season. After flowering, a rest should be allowed for a time, by withholding water, which, at other times, should be freely given. The plants may then be cut back, and encouraged to make a little growth before winter. Repot in early spring, according as the different sized plants require, using a compost of loam and decayed manure, in about equal proportions. Neriums are propagated by cuttings of matured

FIG. 685. LEADING BRANCHLET OF NERIUM OLEANDER.

leading shoots (see Fig. 685), inserted in single pots, and placed in a close, warm frame; or they may be rooted successfully in bottles of water, and afterwards potted carefully in soil. Established plants may be placed in a warm position in the open air, in summer, or kept in a light, airy greenhouse. They are subject to several insect pests, especially Red Spider and Mealy Bug. Frequent sponging will be necessary, in order to keep the leaves clean and healthy.

N. odorum (sweet-scented). *fl.* pale red, with an agreeable musky scent; segments of the crown multifid, filamentose at the apex. June to August. *l.* linear-lanceolate, three in a whorl, coriaceous, with revolute edges, 6in. to 10in. long. *h.* 6ft. to 8ft. East Indies, 1683. Of this species, the following are varieties: *carneum*, with flesh-coloured flowers (B. M. 2032); *flore-pleno*, with flowers nearly double (B. M. 1799).

N. Oleander.* Common Oleander. *fl.* bright red, rather large; segments of corona trifid or cuspidate. June to October. *l.* lanceolate, three in a whorl, 4in. to 5in. long, dark green. *h.* 6ft. to 14ft. Mediterranean region, &c., 1596. (S. F. G. 248.)

Varieties. The following is a list of the most desirable varieties of the common Oleander; many of them are of Continental origin:

Album plenum. Flowers white, large; corolla double. Very pretty. See Fig. 686.

Nerium—*continued.*

Cupreatum. Flowers large, single, copper-coloured; lobes well expanded. Free-flowering.

Felix Bourguet. Flowers, inside pale saffron, outside rosy previous to opening, single. Very free-flowering.

Henri Mares. Flowers rosy-pink; corolla double. A beautiful shade of colour.

Madame Peyre. Flowers cream, semi-double. A good variety.

Madonna grandiflorum. Flowers creamy-white, large; lobes broad; corolla double. Very fine.

Mons. Balaguier. Flowers very pale pink, arge, well expanded. A delicate colour.

Paulin Gregoire. Flowers large, single. Beautiful bright rose colour.

FIG. 686. FLOWERING BRANCHLET OF NERIUM OLEANDER ALBUM PLENUM.

Professor Duchartre. Flowers deep rosy-purple, of medium size; corolla double. Fine and distinct.

Professor Durand. Flowers pale yellow, hose-in-hose. Very free-flowering.

Rose Double. Flowers bright rose, double. Large and fine.

Sœur Agnes. Flowers pure white, single. Very pretty.

Souvenir du Felix Dunal. Flowers bright rose, large; corolla double. Very good

Splendens. Flowers bright red, double.

Variegatum. Flowers red; leaves edged with white or yellow.

NERTERA (from *nerteros*, lowly; referring to the habit of the species). SYNS. *Cunina*, *Erythrodanum*, *Leptostigma*, *Nerteria*. ORD. *Rubiaceæ*. A genus comprising about half-a-dozen species of very small, slender, creeping herbs, indigenous to the mountains of Java, the Philippine and Sandwich Islands, the Andes of South America, Australia, New Zealand, and the Antarctic lands. Flowers axillary, inconspicuous, sessile. Berry red, ovoid or globose, two-stoned. Leaves small, opposite, sessile or petiolate, ovate or ovate-lanceolate. *N. depressa*, commonly known under the absurd name of Flowering or Fruiting Duckweed, the only species introduced, is a charming hardy, alpine, perennial rock plant, which forms a dense carpet, close on the ground, of creeping stems and tiny leaves, and is exceedingly attractive when covered with orange-red or crimson berries. It may be increased from seeds, but is more frequently propagated by division of the root; any small pieces will grow freely, especially if placed in a little warmth. The plants thrive in a sandy

Nertera—*continued.*

loam, to which the addition of some leaf soil is recommended. They prefer shade to bright sunshine, in summer, and if grown in the open, should be protected with a bell glass in winter. *N. depressa* is also well adapted for culture in pots or shallow pans. The plants, when inserted in early spring, should be placed in a little warmth until established, when a cool, airy position will be more suitable for the production of flowers, and, subsequently, berries. When the latter are set, the pots are sometimes utilised for plunging in carpet-bedding designs, where they prove most interesting and effective. The plants require plentiful supplies of water at the roots.

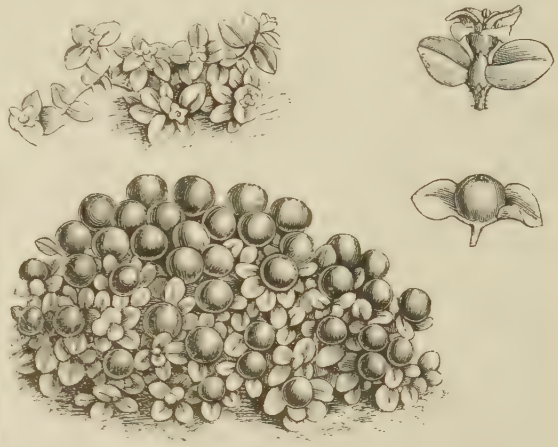


FIG. 687. NERTERA DEPRESSA, showing Plants in Flower and Fruit, and detached Flower and Fruit.

N. depressa (depressed).* Bead Plant. *fl.* greenish, inconspicuous, minute. *fr.* bright orange, globose, the size of small peas, produced in great profusion. *l.* small, ovate, almost fleshy. Stems smooth, creeping, rooting, thickly clothed with leaves. Antarctic Mountains, 1868. See Fig. 687. (B. M. 5799.)

NERTERIA. A synonym of **Nertera** (which *see*).

NERVES. The strong veins upon leaves or flowers.

NERVOSE, NERVOUS. Full of nerves.

NESÆA (said to be from *nesos*, an island; on account of its having been found in the Island of Mauritius). Including *Heimia*. ORD. *Lythrarieæ*. A genus comprising about a dozen species of glabrous or tomentose, erect, leafy, half-hardy herbs or sub-shrubs, with quadrigonal branches inhabiting the warmer parts of America and Africa. Flowers yellow, purple, or blue, disposed in axillary and often trichotomously divided peduncles, sometimes capitate; petals four to seven, inserted in the mouth of the calyx. Leaves opposite, rarely ternately whorled or alternate, entire. Seeds of the annual species must be sown in heat, in spring, and the plants hardened off and inserted in the open border at the end of May or beginning of June. The sub-shrubs, &c., succeed in sheltered spots, in any common garden soil. Propagated by seeds, by divisions of the root, or by cuttings. The two species here described are probably the only ones yet introduced.

N. salicifolia (Willow-leaved). *fl.*, petals obovate. August. *l.* ternate or opposite, the uppermost ones often alternate, very shortly stalked, lanceolate, acute, narrow at base. *h.* 5ft. Mexico, &c., 1821. Sub-shrub. SYN. *Heimia salicifolia*.

N. triflora (three-flowered). *fl.* blue, in threes, on the apex of the peduncle. August. *l.* opposite, oblong-lanceolate, obtuse or acute, on short petioles. *h.* 2ft. to 3ft. Mauritius, &c., 1802. A slender, half-hardy annual.

NETTED. Covered with reticulated projecting lines.

NETTING. For the protection and preservation of ripe fruits, seeds, seedling plants, &c., Netting of some description is an indispensable article in gardens. That made from wire, and afterwards galvanised, is mostly used when a permanent protection is needed, such as for keeping away ground-vermin from plants and trees which are known to be in danger of destruction in consequence of the bark or the whole plant being eaten. Old fish-nets are cheap, and form the best material for temporarily protecting fruits, seeds, &c., from the ravages of birds. When hung over fruit blossoms, in spring, Nets are frequently of great service in warding off the effects of frost, and admitting light at the same time. Netting of either kind is usually spoken of as being of a certain mesh; this signifies the diameter of the holes in it, and forms a guide in selecting for various purposes. It will generally last for several years, if taken care of, and kept in a dry place when not in use.

NETTLE. *See* **Urtica.**

NETTLE, DEAD. *See* **Lamium.**

NETTLE-TREE. *See* **Celtis.**

NEUBECKIA. Included under *Iris.*

NEUBERIA. A synonym of **Watsonia** (which *see*).

NEUDORFIA. A synonym of **Nolana** (which *see*).

NEUMANNIA. Included under **Pitcairnia** (which *see*).

NEURODIUM. *See* **Tænitis.**

NEUROLÆNA (from *neuron*, a nerve, and *læna*, a covering; referring to the three-nerved segments of the involucre). SYN. *Calea.* ORD. *Compositæ.* A genus comprising a couple of species of tall, stove or greenhouse, sub-shrubs, of which one is a native of Columbia and the West Indies, and the other of Mexico. Flower-heads whitish, small; involucre campanulate; bracts three or four-seriate, imbricate, narrow, membranous, rather obtuse. Leaves alternate, entire, denticulate, or lower ones three-lobed. Only one species, *N. lobata*, has been introduced. It thrives in a compost of loam, leaf mould, and sand, and should be grown in a light situation near the glass in a warm greenhouse.

N. lobata (lobed). *fl.-heads* yellow; corymbs heaped. June and July. *l.* variable, oblong-lanceolate or ovate-lanceolate, cuneate below the lobes, puberulous, scabrous, or tomentose beneath. *h.* 2ft. West Indies, 1733. (B. M. 1734, under the name of *Calea lobata.*)

NEUROPTERA. *See* **Insects.**

NEUROSPERMA. Included under **Momordica** (which *see*).

NEWBOULDIA (named in honour of the Rev. W. W. Newbould, one of the most genial and painstaking of British botanists). SYN. *Spathotecoma.* ORD. *Bignoniaceæ.* A genus comprising three species of glabrous stove trees, natives of tropical Africa. Flowers pink-violet, in thyrsoid panicles. Leaves, for the most part, opposite, sometimes ternately whorled, or slightly scattered, pinnate; leaflets often serrulate. The species here described is the only one introduced. For culture, *see* **Tecoma.**

N. lævis (smooth-leaved). *fl.* rosy-white or purple, in many-flowered, corymbose, terminal panicles. *l.* alternate or ternately-verticillate, impari-pinnate. (B. M. 4537, under name of *Spathodea lævis.*) *S. pentandra* (B. M. 3681) is probably a mere form of this species.

NEW JERSEY TEA. *See* **Ceanothus americanus.**

NEW ZEALAND FLAX. *See* **Phormium tenax.**

NEW ZEALAND SPINACH (*Tetragonia expansa*). A hardy or half-hardy annual, introduced by Sir Joseph Banks from New Zealand, where, amongst several other places, it is found native. The plants are cultivated in gardens for the use of the young leaves, which form a substitute for those of the ordinary Spinach. They are, however, of inferior quality when cooked; but, as the plants grow very vigorously, do not run to seed, and withstand drought much better than the other varieties, a few should always be grown in case of a substitute being required in summer. They are propagated by seeds, which are very hard, and should be steeped in water before being sown. Sow on a gentle hotbed some time in March; protect the seedlings afterwards until May, when they may be planted out-

FIG. 688. BRANCHLET OF NEW ZEALAND SPINACH.

side. Distances of about 3ft. each way will usually be sufficient; a little more space might be allowed in extra good soils. New Zealand Spinach prefers a rather light rich soil, and succeeds best on a border with southern aspect. If the leaves are pinched off, and used when young, others will be freely produced, and keep up a succession. See Fig. 688.

NHANDIROBA. A synonym of **Fevillea** (which *see*).

NICANDRA (named after Nicander, of Colophon, who lived about 150 A.D., and wrote on medicine and botany). SYN. *Calydermos.* ORD. *Solanaceæ.* A monotypic genus, the species being an erect-branching, glabrous, hardy, annual herb. Propagated by seeds, sown in the open border. As soon as the seedlings are up, they must be planted separately: the plants, being large, require a good deal of space.

N. physaloides (Winter-cherry-like).* *fl.* blue, rather large, extra-axillary, solitary, drooping; calyx pentagonal, five-parted, inflated; stamens five. July to September. Berry fleshy, almost dry, three to five-celled, inclosed in the calyx. Leaves petiolate, membranous, deeply sinuate-dentate, or slightly lobed. *h.* 2ft. to 4ft. Peru, 1759. (B. M. 2458.)

NICOTIANA (named after Jean Nicot, 1530-1600, of Nismes in Languedoc; he was agent from the King of France to Portugal, and introduced tobacco into France). Tobacco. ORD. *Solanaceæ.* An extensive genus (upwards of fifty species have been described, of which probably not more than thirty-five are distinct) of mostly greenhouse or half-hardy herbs, sometimes suffruticose,

Nicotiana—*continued.*

rarely glabrous, sub-arborescent shrubs; they are mostly natives of America, a few are indigenous to the Pacific Islands and Australasia, and some are not unfrequently cultivated in various parts of the globe. Flowers white, yellowish, greenish, or purplish, disposed in terminal panicles, or in elongated, unilateral, bracteate or ebracteate racemes, or the lower ones solitary in the axils; calyx five-cleft; corolla funnel- or salver-shaped, sometimes with a very long tube, the limb five-lobed. Leaves undivided, entire or rarely sinuated. Nicotianas thrive best in rich, deep soil, and in a rather moist situation, where they will grow with great rapidity. Seeds should be sown in February, in gentle heat, and the young plants pricked out when large enough. They should be placed in the open air early in June. The species are employed with great advantage in sub-tropical gardening. *N. affinis* succeeds admirably and flowers freely in 6in. pots, and thus forms a useful subject for greenhouse decoration. Its flowers are partially closed by day, but open at about 6 p.m., and emit a powerful perfume in the evening and night. It is also suited, on this latter account, for planting, in the summer time, in beds that are situated near walks.

FIG. 689. PLANT (EXCEPTING RADICAL LEAVES) AND DETACHED FLOWER OF NICOTIANA ACUTIFLORA.

N. acuminata (taper-pointed). *fl.*, corolla green-lined, about 3in. long; limb spreading; panicles few-flowered. Summer. *l.* broad-lanceolate, acuminate, undulated, stalked, entire, sometimes sub-cordate. Stem branched. *h.* 3ft. Valparaiso, &c. Herb. (B. M. 2919.) SYN. *Petunia acuminata.*

N. acutiflora (acute-flowered).* *fl.*, corolla pure white, 4in. long, cylindrical; lobes acute; calyx pubescent, about ⅜in. long. From

Nicotiana—*continued.*

June until frost. *l.*, radical ones oblong; upper ones distant, auriculate at base. Stem erect, 1ft. to 2ft. high. Brazil. A handsome annual herb, well suited for decorative purposes. See Fig. 689.

FIG. 690. FLOWERS OF NICOTIANA SUAVEOLENS.

N. affinis (related).* *fl.* deliciously night-scented; corolla with a slender tube 3in. to 3½in. long; limb 3in. across, consisting of five ovate, blunt segments, white inside, greenish outside. *l.*, lower ones numerous, about 6in. long, ovate, obtuse, narrowed into a winged petiole; upper ones smaller, more decidedly amplexicaul, broad. *h.* 2ft. to 3ft. Half-hardy annual herb. A splendid conservatory plant, hairy all over, except the inside of the corolla. (G. C. n. s., xvi. 141.)

FIG. 691. PORTION OF INFLORESCENCE OF NICOTIANA TABACUM.

N. fragrans (fragrant). *fl.* almost white, large, terminal, pendent, very fragrant; corolla with a very long tube and a broad limb; panicle large, terminal, the branches bearing glomerated racemes. Summer. *l.*, radical ones large, broadly ovate, spathulate; cauline ones few, distant, linear-spathulate, thick and fleshy. *h.* 3ft. to 4ft. Isle of Pines. Plant hairy, except inside of corolla limb. Cool greenhouse herb. (B. M. 4865.)

N. glauca (glaucous).* *fl.* yellow, covered with soft down; corolla having the tube slightly curved, the throat slightly inflated, the mouth contracted, the limb small, cup-shaped, with short acute segments; panicles terminal. August to October. *l.* unequally cordate-ovate, naked. *h.* 10ft. to 20ft. Buenos Ayres, 1827. Shrub, glaucous in every part, arboreous, erect, branched. (B. M. 2837.)

Nicotiana—*continued.*

N. Langsdorffii (Langsdorff's). *fl.* paniculate, nodding, subsecund; corolla green or yellowish-green; tube 1in. long, limb sub-plicate; peduncles very long, branched. August. *l.*, lower ones lanceolate, acute, sessile, decurrent. Stem branched, 5ft. high. Brazil, 1819. Herb. (B. M. 2221, 2555.)

N. longiflora (long-flowered).* *fl.* lateral, solitary, pedicellate, often opposite the leaves, in terminal simple racemes; corolla white at first, afterwards purple or yellowish-green; limb white inside. August. *l.*, radical ones ovate-lanceolate, acute; cauline ones cordate-lanceolate, acuminate. *h.* 3ft. Buenos Ayres, 1832. Herb. (S. B. F. G. ser. ii. 196.)

N. noctiflora (night-flowering). *fl.* white, purplish beneath, odorous at night; corolla tube thrice as long as the calyx. August. *l.* petiolate, oblong-lanceolate, acute, undulate-crisped. Stem 2ft. to 3ft. high. Chili, 1826. Herb. (B. M. 2785; S. B. F. G. 262.)

FIG. 692. NICOTIANA WIGANDIOIDES.

N. persica (Persian). *fl.* in extra-axillary, shortly pedicellate racemes; corolla white within, green without; tube 2½in. long. August. *l.*, radical ones oblong-spathulate, acute, cordate at base; cauline ones sessile. *h.* 5ft. Persia (cultivated), 1831. This herb yields the celebrated Shiraz tobacco. (B. R. 1592.)

N. suaveolens (sweet-scented).* *fl.* white, disposed in loose panicles, fragrant; tube of corolla cylindrical. Summer. *l.* subpetiolate, ovate-lanceolate, undulate. Stem nearly simple. *h.* 1ft. to 2ft. Australia, 1800. Herb. See Fig. 690. (B. M. 673, under name of *N. undulata.*)

N. Tabacum.* Common Tobacco. *fl.* rose, downy outside; corolla inflated, ventricose; segments of the limb acuminated; racemes short, many-flowered. Summer. *l.* sessile, oblong-lanceolate, acuminated. *h.* 4ft. America, 1570. Plant downy, clammy. Herb. See Fig. 691. (B. M. Pl. 191.)

N. T. fruticosa (shrubby). "This variety differs from the type only in the shrubby base of its stem and its narrower leaves" (Hooker). (B. M. 6207.)

Nicotiana—*continued.*

N. undulata (wavy-leaved). A synonym of *N. suaveolens.*

N. wigandioides (Wigandia-like).* *fl.* yellowish-white, in large drooping panicles; corolla hypocrateriform. *l.* large, ovate-acuminate, pilose. Columbia. Greenhouse shrub, well adapted for sub-tropical gardening. See Fig. 692. (B. H. 1873, 18.)

NICOTINE SOAP. *See* **Insecticides.**

NIDULANT. Nestling; lying as a bird in its nest.

NIDULARIUM. This genus is now regarded, by the authors of the "Genera Plantarum," as a synonym of **Karatas** (which *see*).

N. latifolium. *See* **Canistrum viride.**

N. Lindeni. *See* **Canistrum eburneum.**

NIEREMBERGIA (named after John Eusebius Nieremberg, 1595-1658, a Spanish Jesuit, author of a work on the Marvels of Nature). ORD. *Solanaceæ.* A genus comprising about a score species of mostly half-hardy, elegant, perennial herbs, creeping, diffuse, or rarely almost erect, often slender and glabrous; they are natives of extra- and sub-tropical America. Flowers pale violet or whitish, on solitary pedicels; limb of corolla often elegantly expanding; tube slender, elongated. Leaves entire. The hardy species prefer a light but not very dry soil, and are all easily increased by cuttings, placed in a gentle heat. The species best adapted for growing in cool houses are of comparatively easy culture. They thrive best in a compost of three parts good sandy loam, and one of thoroughly decomposed manure and sharp sand. These kinds should be propagated, during August, by cuttings, which, when well rooted, should be potted off singly and placed for the winter on a light, airy shelf in the greenhouse; only enough water being given to prevent flagging. In February or March, shift into 5in. pots, in which the plants may be allowed to flower, or they may be transferred afterwards to beds or vases outside. Propagated also by seeds, which should be sown in a warm greenhouse during spring or in autumn, and the plants grown on in the way recommended above for cuttings. The undermentioned species are those best known to cultivation.

N. calycina (large-calyxed).* *fl.* yellow at the base, with a yellowish tube and a white limb; peduncles lateral, one-flowered, short. September. *l.* opposite and alternate, roundish-obovate, petiolate. Stems procumbent. Buenos Ayres, 1834. Plant clothed with glandular pubescence. Half-hardy. (B. M. 3371; S. B. F. G. ser. ii. 319.)

N. filicaulis (thread-stemmed).* *fl.* usually lilac, with a yellow centre; tube slender, glandular; peduncles opposite the leaves, one-flowered. May. *l.* linear-lanceolate, acute or obtuse. *h.* 6in. to 12in. Buenos Ayres, 1832. Plant glabrous, erect, filiform. Greenhouse. (B. M. 3370; S. B. F. G. ser. ii. 243.)

N. frutescens (shrubby).* *fl.* delicate blue, shaded to white at the edges, about 1in. in diameter, densely produced on much-branched flax-like stems. Early summer. *l.* linear, 1½in. to 2in. long. *h.* 1ft. to 1½ft. Chili, 1867. A handsome hardy species, with a shrubby habit.

N. gracilis (slender).* *fl.* terminating the young branches; limb white, streaked with purple, with a yellow centre; tube very long. Summer. *l.* linear, sub-spathulate, obtuse. Stems erectish. *h.* 6in. to 12in. Buenos Ayres, 1831. Plant downy, half-hardy. An excellent and very floriferous species, well

Nierembergia—*continued.*

adapted for pot culture and greenhouse decoration. (B. M. 3108; S. B. F. G. ser. ii. 172.)

N. rivularis (brook-loving).* *fl.* white, with a yellowish, and, sometimes, a rosy tinge; corolla bell-shaped, about 1in. across, with a very slender tube, 1in. to 2½in. long. July. *l.* very variable in size, oblong or spathulate, obtuse. Stems much branched and matted, slender, smooth, creeping and rooting. La Plata, 1866. A handsome hardy perennial when well grown; moisture and a little shade being the chief conditions required. In bare places, or the more moist parts of rockwork, it may be grown with capital effect; but the patches should be broad. It also forms a good surfacing subject for leggy plants or shrubs. Propagation is best effected by divisions in spring, just as the new growth commences. (B. M. 5608.)

N. Veitchii (Veitch's). *fl.* pale lilac, with a very slender corolla tube, 1in. long. *l.* ovate-oblong. Stems slender, branching, prostrate. South America, 1866. Greenhouse. (B. M. 5599.)

NIGELLA (a diminutive from *niger*, black; referring to the colour of the seeds). Devil-in-the-Bush; Fennel Flower; Love-in-a-Mist. Including *Garidella*. ORD. *Ranunculaceæ*. A genus comprising about half-a-score species of curious, hardy, erect-growing annuals, inhabiting the Mediterranean region and Western Asia. Flowers white, blue, or yellowish; calyx of five petal-like deciduous sepals; petals five, two-lipped, with a hollow, nectariferous claw. Stem leaves alternate, cut into very narrow, sub-pinnate segments. Nigellas are of the easiest culture in any moderately good garden soil. Seeds should be sown in March or April, in the open border, in light soil, and the seedlings thinned out to 6in. apart. The species most generally grown are *N. damascena* and *N. hispanica*.

FIG. 693. NIGELLA DAMASCENA FLORE-PLENO, showing Habit and detached Flowering Branchlet.

N. damascena (Damascus).* *fl.* white or blue, large, surrounded by a mossy involucre; sepals spreading. Summer. *l.* bright green, finely cut. *h.* 1ft. to 2ft. South Europe, 1570. (B. M. 22.) Of this there is a double-flowered variety, *flore-pleno*. See Fig. 693.

N. hispanica (Spanish).* *fl.* deep blue, with blood-coloured stamens, large, without any involucre. Summer. *h.* 1ft. to 2ft. Spain and Southern France, 1629. (B. M. 1265.)

N. Nigellastrum (Star Nigella). *fl.* brown and green; petals sessile, spreading. July. *l.* very slender. *h.* 1ft. South Europe, 1736. (B. M. 1266, under name of *Garidella Nigellastrum*.)

N. orientalis (Eastern).* *fl.* yellow, spotted with red. Summer. *l.* divided into long narrow segments, pale glaucous green. *h.* 1½ft. Asia Minor, 1699. An inferior species, but very curious in both flower and carpels. (B. M. 1264.)

N. sativa (cultivated). *fl.* bluish, destitute of an involucre. July. *l.*, segments short, linear, diverging. Stem erect, rather hairy. *h.* 1½ft. South Europe, North Africa, Asia Minor, 1548. This plant is supposed, by some persons, to be the Fitches mentioned in Isaiah xxviii. 25, 27. See Fig. 694. (S. F. G. 511.)

NIGER. Black.

NIGGER CATERPILLAR. *See* **Turnip Sawfly.**

NIGHTFLOWER. *See* **Nyctanthes.**

NIGHT MOTHS. *See* **Noctua.**

NIGHT-SCENTED STOCK. A common name applied to *Hesperis tristis*, *Mathiola odoratissima*, &c.

NIGHTSHADE. *See* **Solanum.**

FIG. 694. FLOWER-STEM, WITH LEAF, OF NIGELLA SATIVA.

NIGHTSHADE, DEADLY. A common name for *Atropa Belladonna*.

NIGHTSHADE, ENCHANTER'S. *See* **Circæa.**

NIGRESCENS, NIGRICANS. Blackish.

NIGRINA. A synonym of **Melasma** (which *see*).

NIOBE. Included under *Funkia*.

NIPA (its Moluccan name). ORD. *Palmæ*. A monotypic genus. The species is an ornamental, unarmed, stove Palm. This plant is somewhat difficult to grow; its pot should be partially or nearly submerged in a tank in which tropical aquatics are cultivated.

N. fruticans (shrubby). *fl.* monœcious, axillary, enclosed in a spathe. *fr.* drupaceous, angular, one-seeded, aggregated in large heads. *l.* terminal, pinnatisect, often more than 20ft. long; segments lanceolate, acuminate, plicate-nerved, glaucous paleaceous beneath; margin recurved at base. Trunk horizontal, elongated, robust. Estuaries of rivers of tropical Asia and Australia, 1822.

NIPACEÆ. Included under *Palmæ*.

NIPHÆA (from *niphos*, snow; in allusion to the white flowers). ORD. *Gesneraceæ*. A very small genus (two species) of softly villous, stove, herbaceous plants, of which one is Mexican, and the other a native of Cuba. Flowers white; corolla rotate, broadly five-lobed; tube very short; pedicels fascicled in the axils. Leaves petiolate, ovate, toothed, soft, sub-membranous. Stems dwarf, erect; roots creeping. For culture, *see* **Achimenes.**

Niphæa—*continued.*

N. albo-lineata (white-lined). A synonym of *Phinæa albo-lineata.*

N. oblonga (oblong).* *fl.* white, axillary and terminal, drooping. Winter. *l.* oblong-cordate, toothed, rugose. *h.* 1ft. Guatemala, 1841. (B. R. 1842, 5.)

N. rubida (reddish). A synonym of *Phinæa rubida.*

NIPHOBOLUS. Included under **Polypodium** (which *see*).

NIPHOPSIS. Included under **Polypodium** (which *see*).

NISSOLIA (named after William Nissole, French botanist, Professor at Montpellier, born 1647, died 1735). ORD. *Leguminosæ.* A small genus (only two species) of stove suffruticose herbs, of twining habit, indigenous to tropical America. Flowers yellow, in axillary racemes, or thyrsoid at the tips of the branches. Pods linear. Leaves impari-pinnate; leaflets few, exstipellate; stipules setaceous. Nissolias thrive in a peat and loam compost. Propagated by cuttings of short, stubby, half-ripened shoots, in spring or summer. Probably none of the species are now in cultivation.

NITIDUS. Having an even, smooth, polished surface, as instanced in many seeds.

NITTA-TREE. *See* **Parkia africana.**

NIVENIA (named in honour of James Niven, a botanical collector, especially of African plants). SYN. *Paranomus.* ORD. *Proteaceæ.* A genus comprising a dozen species of large greenhouse, evergreen, erect, leafy shrubs, natives of South Africa. Flowers in terminal or axillary spikes; florets in fours, within a persistent, hairy involucre of four leaves. Leaves simple or much divided, with filiform, sharp-pointed segments. The species require treatment similar to **Protea** (which *see*). The two species here described are probably the only ones yet introduced.

N. crithmifolia (Crithmum-leaved). *fl.* purple; spikes subsessile, cylindrical, dense. July. *l.* bi- or tri-ternate, slender, almost filiform, 1in. to 1½in. long. *h.* 4ft. 1810. (A. B. R. 243, under name of *Protea Lagopus.*)

N. media (middle). *fl.* purple; spikes ovate-oblong, terminal, solitary or sub-umbellate. July. *l.* sub-triternate, glabrous, 2in. long. *h.* 2½ft. 1786. (A. B. R. 234, under name of *Protea spicata.*)

NIVEUS. Snow-white; the purest white.

NOCCA. A synonym of *Lagascea.*

NOCCÆA. A synonym of **Lagascea** (which *see*).

NOCTUA (Night Moths). A name applied with a considerable diversity of comprehensiveness in respect to the number of insects included under it, though, even in the widest acceptance, the species are all heavy in body, with somewhat narrow front wings, dull coloured, but variegated with spots and cross bands. Used originally to denote any member of the great group now called *Noctuina*, it became restricted to the family *Noctuidæ*, and finally to the genus *Noctua.* A brief account of the family *Noctuidæ* is here given. The distinctive characters are not easily put into words, yet the general aspect is somewhat easily recognised in the family. The front wings are narrow and laid flat, and so overlap as to render the whole insect narrow when at rest. In most of the species, the spread of wings averages about 1½in., varying from 1in. to 2½in. The larvæ are usually cylindrical, thick, and smooth, and hide during the day either below ground or in and below the plants on which they feed at night: they are usually dull in colour of markings (see Fig. 695). The pupæ are protected in earthen cocoons underground. The family includes four British genera, viz.: *Rusina* with one species, which has the fore wings brown, with three dark cross lines, and the hind wings dark grey, with darker fringes; *Triphæna* (the Yellow Under-wings), from 1¼in. to 2¼in. in spread of wing, easily

Noctua—*continued.*

known by the hind wings being yellow or orange, with a black band along the rear margin; *Agrotis* (the Dart Moths), and *Noctua*, both of which latter have grey hind wings, and vary from 1in. to 2in. in spread of wings; the chief differences between them resting in the narrower fore wings, and, in *Agrotis*, different arrangements in markings of the fore wings. *Agrotis* numbers twenty-three British species, *Noctua* twenty, and *Triphæna* six. The larvæ of almost all these genera devour herbaceous plants or Willows; and many of them can thrive on a large variety of plants. Some attack the roots, others the leaves and the young stems, of many of our cultivated potherbs; and a considerable proportion may be included among the most hurtful of garden pests. Indeed, this family probably contains the Moths most hostile to gardeners. *Noctua* is, perhaps, the least injurious of the three genera, since few of the larvæ in it are in the habit of feeding largely on garden produce. *Triphæna*, though with fewer species, is probably more

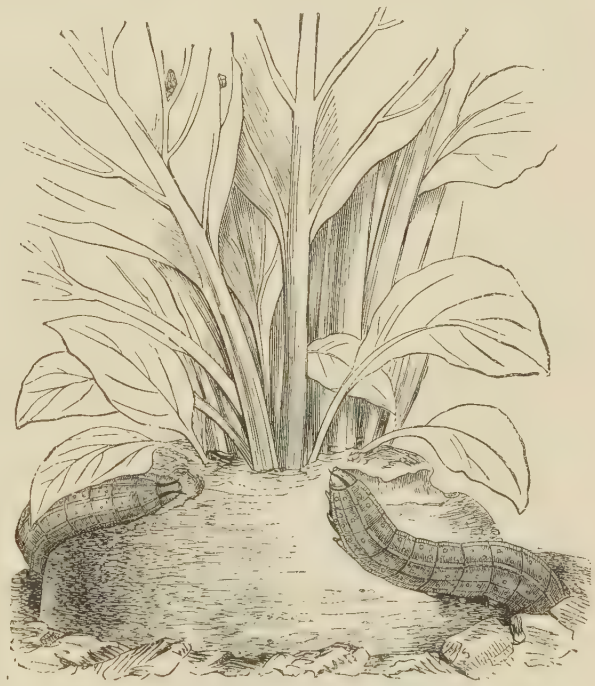


FIG. 695. CATERPILLARS OF TURNIP MOTH (AGROTIS SEGETUM).

destructive; but pre-eminent in this respect is *Agrotis.* In this genus, many of the species live habitually on Turnip roots (*see* **Turnip Moth**), on Cabbages, and on almost all other vegetables grown for food. The most injurious kinds may be specified as the Turnip Moth (*A. segetum*), the Heart and Dart (*A. exclamationis*)—like the last, very destructive to Turnip roots in winter, though omnivorous when pressed by hunger—the Garden Dart (*A. nigricans*), and the White-line Dart (*A. Tritici*); though several of the remaining species are also harmful at times. To attempt to describe the above species individually, would far exceed the space available here.

Amongst the best methods for getting rid of the caterpillars are to lay soot or gas-lime around the stems of the plants, so as to prevent access to them; or to manure with guano, and earth-up the plants, to stimulate repair of injuries caused by the insects. If only a few choice plants are attacked, it is advisable to remove the soil from the upper part of the root, and to pick out

Noctua—*continued.*

the larvæ; or to examine the plants with a lantern at night, and to pick off such as are visible. Those that live in the hearts of the plants cannot be removed without the destruction of the parts in which they lie. In the protection of Turnips, and other field crops, rooks and partridges afford the best aid, though starlings and other birds also eat not a few larvæ.

NODE. That part of a stem from which a leaf, complete or incomplete, arises.

NODOSE, NODULOSE. Having many nodes, or knots.

NODULES. Small hard nodi, or knots.

NOISETTIA (named after Louis Claude Noisette, 1772-1849, an eminent French cultivator of fruit trees, author of "Le Jardin Fruitier"). ORD. *Violarieæ*. A small genus (two species) of erect, almost simple, stove sub-shrubs, inhabiting tropical and Northern sub-tropical America. Flowers in the axils, shortly racemose or fasciculate; pedicels articulated above the middle. Leaves alternate, simple. The species thrive in a thoroughly well-drained compost of sandy loam and leaf mould, and require a light place near the glass. Propagated by cuttings, inserted in sand, under a hand glass, in heat.

N. longifolia (long-leaved). *fl.* cream-coloured or white, in bundles; spur awl-shaped. *l.* lanceolate, serrated, acute, tapering into short footstalks. *h.* 1ft. to 1½ft. Cayenne, 1824.

NOLANA (from *nola*, a little bell; alluding to the shape of the corolla). SYNS. *Neudorfia, Sorema, Teganium.* ORD. *Convolvulaceæ*. This genus consists of about eight species of hardy, glabrous or pubescent, often diffuse or prostrate herbs, natives of Chili and Peru. Flowers whitish, bluish (or pink?), in the axils, shortly pedunculate; calyx campanulate; corolla broad, almost funnel-shaped. Leaves solitary or twin, sessile or petiolate, entire, flat, sometimes slightly fleshy. The species are of easy culture in any moderately good garden soil, and in a sunny situation. Seeds should be sown in the open border during April or May. The species best known to cultivation are the following:

N. atriplicifolia (Atriplex-leaved). *fl.* large; throat white, yellow inside. Summer. *l.* spathulate; radical ones large. Stems procumbent, rather villous. Peru, 1834. SYN. *N. grandiflora*. (S. B. F. G. ser. ii. 305.)

N. grandiflora (large-flowered). A synonym of *N. atriplicifolia*.

N. lanceolata (lanceolate).* *fl.* blue, white, green, solitary in the axils. July. *l.* twin, lanceolate, semi-amplexicaul, obliquely adnate at base. *h.* 6in. Chili, 1860. (B. M. 5327.

FIG. 696. FLOWERING BRANCHLET OF NOLANA PARADOXA.

N. paradoxa (paradoxical).* *fl.*, corolla campanulately funnel-shaped. Summer. *l.* ovate, obtuse, pilose. Stem prostrate, hairy. Chili, 1825. See Fig. 696. (B. R. 865.)

N. paradoxa (paradoxical), of Sims. A synonym of *N. tenella*.

Nolana—*continued.*

N. prostrata (prostrate). *fl.* pale blue. July. *l.* ovate-oblong, twin, rhomboid-ovate, entire. Peru, 1761. (B. M. 731.)

N. tenella (tender).* *fl.* pale blue, with a paler eye, on hairy, filiform peduncles. Summer. *l.* ovate, obtuse at both ends. Stems filiform. Plant clothed with viscid down. Chili, 1824. (B. M. 2604, under name of *N. paradoxa*.)

NOLANACEÆ. Included under *Convolvulaceæ*.

NOLINA (named after P. C. Nolin, a French botanist of the last century). SYN. *Roulinia.* ORD. *Liliaceæ*. This genus is included, by Mr. Baker, under *Beaucarnea*. There are about a dozen species, natives of Mexico, Texas, &c. *N. georgiana* is a showy, half-hardy plant, with a very large tunicated bulb; it would probably prove hardy in favoured localities in Southern counties. Under glass, in a cool house, it thrives in a well-drained sandy-loam compost, and, during the season of rest, water should be sparingly administered. Increased by offsets. *N. longifolia* and *N. recurvata* are described under **Beaucarnea** (which *see*).

N. georgiana (Georgian).* *fl.* whitish, small, disposed on an erect stalk, 2ft. to 3ft. high, and branching at the top into a many-flowered panicle with spreading branches. May. *l.* dry, harsh, toothleted, narrow, strap-shaped. Georgia, 1812. (G. C. n. s., xv. 697.)

NONATELIA. Included under **Palicourea** (which *see*).

NONEA. *See* **Nonnea.**

NONNEA (named after J. P. Nonne, of Erfurt, 1729-1772, a German writer on botany). Sometimes spelt *Nonea*. SYNS. *Echioides, Oscampia.* ORD. *Borragineæ*. A rather large genus (upwards of thirty species have been described) of half-hardy or hardy, annual or perennial, hispid or villous, erect or often diffuse, herbs, natives of Europe, North Africa, and Western Asia. Flowers pink, blue, white, or yellow, erect; cymes at first dense, at length often separating into elongated, leafy-bracted branches; corolla tube cylindrical, lobes imbricated. Leaves alternate. *N. rosea* is probably the prettiest of the two or three species grown in this country. For culture, *see* **Anchusa** (under which several of the species are often classed).

N. rosea (rose-coloured).* *fl.* rose-coloured, with a yellowish-white throat. Summer. *l.* oblong, obtuse. *h.* 6in. to 12in. Asia Minor, &c. Diffuse hardy annual. SYN. *Anchusa latifolia. A. versicolor* (B. M. 3477) is a form in which the flowers are red when in bud, but turn a fine blue when fully expanded.

NOONFLOWER. *See* **Tragopogon pratensis.**

NOPALEA (from *Nopal*, the Mexican name for a Cactus). ORD. *Cacteæ*. A small genus (three species) of fleshy, stove shrubs, inhabiting the West Indies, Mexico, and tropical South America, one being largely cultivated in the tropical regions of the globe. The species are allied to *Opuntia*, from which they differ in having erect and connivent, not expanding, petals, and in the stamens being shorter than the style, but longer than the corolla. Flowers scarlet; perianth inclosed. Leaves small, squamiform, on the younger tubercles. Branches articulated; joints compressed, obovate or oblong; tubercles bearing a few small prickles. Nopaleas thrive under conditions which are found suitable for Opuntias, and most other Cacti. A thoroughly well-drained soil, amongst which should be incorporated a fair proportion of lime rubbish (which acts as a draining agent, and also supplies the lime which, in the form of oxalate, is found in such large quantities in the stems of old plants), is all that is needed. Unlimited sunlight, a fair supply of water when in growth, and a less quantity when at rest, complete the necessary conditions.

N. coccinellifera (cochineal-bearing). *fl.* 1½in. in diameter. August. *l.* soon falling off, leaving a white scar and a tuft of short wool and bristles. Stem and older branches ashen-grey, nearly cylindrical, the younger parts being deep green and flat; joints 5in. to 1ft. long. *h.* 8ft. to 10ft. West Indies, 1688. This plant is widely grown as food for the cochineal insects, of which large quantities are reared on it. SYN. *Opuntia coccinellifera* (B. M. 2741, 2742, under name of *Cactus cochinellifer*.)

NORANTEA (altered from *Gonora-antegri*, the Caribbean name of *N. guianensis*). SYNS. *Ascium*, *Schwartzia*. ORD. *Ternströmiaceæ*. A genus consisting of about eight species of handsome stove epiphytal or climbing shrubs, rarely arborescent, confined to tropical America. Flowers disposed in terminal, elongated, many-flowered racemes; petals and sepals five, imbricated; pedicels jointed at the base, furnished with petiolate, cucullate, or saccate bracts. Leaves coriaceous, entire. The species (of which the two here described are probably the only ones yet introduced) thrive in a compost of loam and peat. Propagated by ripened cuttings, which root freely in sand, under a glass, in heat.

N. braziliensis (Brazilian). *fl.* green in the middle, but white on the margins, racemose, on long peduncles; bracts scarlet. *l.* obovate, stalked. *h.* 6ft. Brazil, 1820. Climber.

N. guianensis (Guiana). *fl.* violet, nearly sessile, on long spikes; bracts large, bladdery or cucullate, scarlet. *l.* oblong, mucronate, coriaceous. Branches red, throwing out roots, by which it supports itself on trees near which it grows. Guiana, 1818. A beautiful species. (A. G. 220.)

NORFOLK ISLAND PINE. *See* **Araucaria excelsa.**

NORNA. A synonym of *Calypso*.

NORWAY MAPLE. *See* **Acer platanoides.**

NORWAY SPRUCE. *See* **Picea excelsa.**

NOTELÆA (from *notos*, south, and *Elaia*, the Olive; in allusion to the form and native place of the species). SYN. *Rhysospermum*. ORD. *Oleaceæ*. A genus comprising eight species of Australian, greenhouse evergreen shrubs or trees, with the habit of Olive, only three of which, probably, have yet been introduced. Flowers in short, fasciculate, axillary racemes; petals four, broad, obtuse, free, or connected by pairs to the filaments at the base. Drupe globose, ovoid or oblong. Leaves opposite, entire. The species thrive in a compost of peat and loam, with a little sand and charcoal added. Propagated, in April, by cuttings of firm side shoots, inserted in sand, under a bell glass, without heat.

N. longifolia (long-leaved). *fl.* white, small; racemes rarely 1in. long. March to June. *fr.* ovoid or globular, dark-bluish. *l.* lanceolate, reticulately veined on both surfaces, more or less downy beneath, dotless, 2in. to 6in. long. 1790. Tall shrub. SYN. *Olea apetala* (A. B. R. 316).

N. ovata (ovate). *fl.* similar to those of *N. longifolia*; racemes few-flowered. June. *fr.* like that of *N. longifolia*. *l.* very shortly petiolate, ovate or broadly ovate-lanceolate, obtuse or acute, rounded or contracted at base, 1½in. to 2in. long. 1824. Shrub.

N. punctata (dotted). *fl.* as in *N. longifolia*. June. *fr.* ovoid, smaller than that of *N. longifolia*. *l.* oblong-lanceolate, 2in. to 3in. long, tapering into a rather long petiole, reticulate above, densely dotted beneath. 1826. Shrub.

NOTHOCHLÆNA (from *nothos*, spurious, and *chlaina*, a cloak; some of the species appear to have involucres). Frequently, but incorrectly, spelt *Nothoclæna*, or *Notholæna*. Including *Cincinalis*. ORD. *Filices*. A genus comprising about thirty-four species of wide-spread, ornamental stove or greenhouse Ferns, differing from *Cheilanthes* only by the absence of a distinct involucre, and connected with it by gradual intermediate changes. The species should be grown slightly elevated above the rim of the pot, and in a compost of fibrous peat, silver sand, and small pieces of sandstone. Thorough drainage is most essential; and the fronds should not be wetted. For general culture, *see* **Ferns.** Except where otherwise stated, all the species here described require greenhouse treatment.

N. candida (white). A synonym of *N. sulphurea*.

N. chrysophylla (golden-fronded). A garden synonym of *N. flavens*.

N. distans (distant). *sti.* densely tufted, 1in. to 3in. long, wiry. *fronds* 6in. to 9in. long, ⅜in. to 1in. broad, bipinnate; pinnæ often much curled together, the lower ones distant, deltoid, cut down to the rachis into oblong, obtuse, entire or slightly lobed pinnules; lower surface and rachis scaly. Australia, &c.

N. Eckloniana (Ecklon's).* *rhiz.* woody, densely scaly. *sti.* 3in. to 6in. long, strong, erect, scaly. *fronds* 6in. to 12in. long, 2in. to

Nothochlæna—*continued.*

3in. broad, bi- tripinnatifid; upper pinnæ close, the lower ones sub-distant, deltoid; pinnules close, lanceolate, pinnatifid or pinnate, with short, oblong segments; lower surface and rachis densely scaly. Cape Colony, &c., 1838. A handsome but very rare species.

N. ferruginea (rusty). *rhiz.* thick, bearing bulb-like scaly buds. *sti.* sub-tufted, 2in. to 4in. long, wiry, erect, slightly matted. *fronds* 6in. to 12in. long, ½in. to 1in. broad, simply pinnate; pinnæ sessile, ¼in. to ⅓in. long, ovate, deeply pinnatifid, with blunt lobes; upper surface pale green, villous; lower densely tomentose; edge inflexed. *sori* black. West Indies, Mexico.

N. flavens (yellow).* *sti.* densely tufted, 4in. to 8in. long, naked. *fronds* 4in. to 9in. long, 2in. to 4in. broad, oblong-deltoid, tripinnate; pinnæ distant, the lower ones deltoid; the pinnules stalked, with oblong segments, 1in. to 1½in. broad; lower surface densely coated with bright yellow powder. *sori* brown, extending from the edge nearly to the midrib. Central America. An elegant greenhouse species, known in gardens sometimes as *N. chrysophylla*. SYNS. *Cincinalis flavens* and *Gymnogramme flavens*.

FIG. 697. FROND OF NOTHOCHLÆNA NIVEA HOOKERI.

N. hypoleuca (white beneath).* *rhiz.* bulbiferous, with dark brown scales. *sti.* tufted, slender, 2in. to 4in. long. *fronds* 4in. to 6in. long, about 1in. broad, bipinnatifid; pinnæ ½in. to ⅔in. long, ¼in. to ⅜in. broad, ovate, cut down nearly or quite to the rachis below into blunt lobes, naked and pale green above, densely tomentose beneath; edge slightly inflexed. Chili.

N. lanuginosa (woolly).* *sti.* densely tufted, woolly, wiry, very short. *fronds* 6in. to 9in. long, 1in. to 1½in. broad, oblong-lanceolate, bipinnate; pinnæ close, lanceolate, the central ones the largest, with close, roundish or oblong, entire or three-lobed pinnules; rachis more or less woolly. South Europe, Australia, 1778. A very handsome species, distinguished from the rest by its dense white woolly tomentum.

Nothochlæna—*continued.*

N. Marantæ (Maranta's).* *rhiz.* woody, with dense fibrillose scales. *sti.* strong, wiry, 3in. to 6in. long, more or less matted. *fronds* 4in. to 12in. long, 1½in. to 3in. broad, oblong-lanceolate, bipinnate; pinnæ lanceolate, cut down to the densely scaly rachis into close, oblong, entire pinnules, one line broad. South Europe, Himalayas, North Africa, &c.

N. mollis (soft). *rhiz.* woolly, thick, with black scales. *sti.* 2in. to 3in. long, strong, erect, matted. *fronds* 8in. to 12in. long, 1½in. to 2in. broad, tripinnate; upper pinnæ close; lower ones distant, lanceolate, with a thick rachis, and often up-curled; segments small, roundish; upper surface dark green, naked; lower surface and rachises woolly. Chili and Andes of Guatemala.

N. Newberryi (Newberry's). *sti.* tufted, 3in. to 5in. long. *fronds* 3in. to 5in. long, lanceolate-oblong, three- or four-pinnate; ultimate segments obovate, crowded, one-third to half a line broad, entire or sub-crenate, both sides covered with a dense white tomentum of slender entangled hairs, more dense below. *sori* rather large, at last emergent from the tomentum. California.

N. nivea (snowy).* *sti.* densely tufted, 4in. to 6in. long, scaly. *fronds* 3in. to 6in. long, 1½in. to 2in. broad, ovate, tripinnate; pinnæ distant, the lower ones deltoid; pinnules long-stalked, with blunt, oblong, or roundish terminal segments, one to two lines long and half a line to one line broad; lower surface coated with pure white powder. *sori* brown. Andes, from Mexico to Peru. A handsome species.

N. n. Hookeri (Hooker's).* "A form known only in cultivation, with close dilated segments and sessile pinnules" (Baker). See Fig. 697.

FIG. 698. FROND OF NOTHOCHLÆNA SINUATA.

N. sinuata (sinuated). *rhiz.* very thick, densely scaly, and bulbiferous. *sti.* sub-tufted, 2in. to 4in. long, firm, erect, matted.

Nothochlæna—*continued.*

fronds 1ft. to 2ft. long, 1in. to 2in. broad, simply pinnate; pinnæ short-stalked, ½in. to 1in. long, ¼in. to ½in. broad, ovate or oblong, varying from entire to deeply pinnatifid; rachis densely scaly; edge slightly inflexed. Mexico, 1831. A handsome stove exhibition fern. See Fig. 698. (B. M. 4699.)

N. squamosa (scaly). *sti.* tufted, 1in. to 4in. long, densely scaly. *fronds* 3in. to 4in. long, 1in. or more broad, ovate-lanceolate, bipinnate; pinnæ opposite, the lowest ½in. long, ¼in. broad, ovate, blunt, cut down to the rachis below into several linear-oblong pinnules; rachis and under surface densely scaly. *sori* brownish; the edge sub-scariose. Mexico to Argentine territory, &c.

N. sulphurea (sulphurous). *rhiz.* creeping, the scales dense, rigid, linear, nearly black. *sti.* tufted, 4in. to 6in. long, wiry, naked. *fronds* 2in. to 3in. each way, deltoid; upper pinnæ simple, central ones lanceolate, cut down to the rachis at the base into oblong lobes; lowest pair with the lowest pinnules much prolonged, ½in. or more long, pinnatifid or pinnate; lower surface coated with white or yellow powder. *sori* black. California, &c. SYNS. *N. candida, Cheilanthes pulveracea,* and *Cincinalis sulphurea.*

FIG. 699. FROND OF NOTHOCHLÆNA TRICHOMANOIDES.

N. trichomanoides (Trichomanes-like).* *rhiz.* thick, bulbiferous, the scales black. *sti.* tufted, 2in. to 4in. long, firm, erect, slightly scaly. *fronds* 6in. to 12in. long, ¾in. to 1½in. broad, simply pinnate; pinnæ sessile, ovate-oblong, blunt, pinnatifid, with blunt lobes; lower surface clothed with white powder and fine ferruginous woolly hairs; the edge inflexed. Jamaica and Cuba, 1844. A very beautiful greenhouse species, and one of the best for growing in a basket. See Fig. 699.

NOTHOCLÆNA. *See* **Nothochlæna.**

NOTHOLÆNA. *See* **Nothochlæna.**

NOTHOLIRION. Included under **Lilium** (which *see*.)

NOTHOSCORDUM (from *nothos*, spurious, and *Scordon*, Garlic; in reference to the near relationship which exists between this genus and *Allium*). Including *Caloscordum*. SYNS. *Hesperocles*, *Oligosma*, *Pseudoscordum*. ORD. *Liliaceæ*. A genus comprising some half-a-score species of greenhouse or hardy bulbous plants, of which one is Chinese, and the rest are found in extra-tropical America and in the Andes region. Flowers in terminal, many-flowered umbels, with the pedicels not articulated; perianth marcescent, persistent; segments six, connate at base or in the middle, in many cases spreading or campanulate-connivent. Leaves radical, linear, flat. Bulbs tunicated. For culture, *see* **Allium** (in which, and in *Milla*, the species of this genus are, by some authorities, distributed).

N. aureum (golden). A synonym of *Bloomeria aurea*.

FIG. 700. NOTHOSCORDUM FRAGRANS, showing Habit and detached Single Flower.

N. fragrans (fragrant).* *fl.* white, with a bar of very pale lilac on the outer side of each division, fragrant, in umbels of from six to twenty. Summer. *l.* linear-lanceolate. *h.* 1½ft. to 2ft. North America, 1822. A vigorous and handsome hardy species. SYN. *Allium fragrans*. See Fig. 700. (B. R. 898.)

N. inodorum (inodorous). *fl.* whitish, with brownish-purple streaks, scentless; umbel lax, six to twelve-flowered. April and May. *l.* all radical, narrow-lorate. Stem 1½ft. high. Carolina, 1770. Hardy. (B. M. 1129, under name of *Allium inodorum*.)

N. macrostemon (large-stamened). *fl.* six to twenty to an umbel; perianth pale lilac or whitish, ½in. to ¾in. deep, the base a green cup; pedicels erect; anthers yellow; scape 1½ft. to 2ft. long. Summer. *l.* developed with the flower, numerous, suberect, fleshy, narrow-linear, 9in. to 12in. long. Buenos Ayres, 1875. Half-hardy. SYN. *Milla macrostemon*.

N. nerinifiorum (Nerine-flowered). This is the correct name of the plant described in this work as *Caloscordum nerinæflorum*.

N. striatellum (slightly-striped). *fl.* greenish-yellow, umbellate; petals ovate, acute, striated; peduncles erect. May. *l.* linear. Chili. Half-hardy. (B. M. 2419, under name of *Ornithogalum gramineum*.)

N. striatum (striated-leaved). *fl.* white; segments six, lanceolate, spreading. May. *l.* 7in. to 8in. high, radical, upright, linear-lorate, striated. *h.* 8in. North-west America, &c. Hardy. (B. M. 1035 and 1524, under name of *Allium striatum*.)

NOTIOPHRYS. A synonym of **Platylepis** (which *see*).

NOTOSPARTIUM (from *notos*, Southern, and *Spartium*, Broom; in reference to the Broom-like appearance of the plant, and its being a native of the Southern hemisphere). ORD. *Leguminosæ*. A most curious monotypic genus, the species being a beautiful and interesting, half-hardy or greenhouse, leafless shrub or small tree, of Broom-like habit. "This, the 'Pink Broom' of the residents in the Middle Islands of New Zealand, is one of the most beautiful plants in the Colony, and is further remarkable as being a member of what is one of the largest families of plants in every part of the world, except New Zealand. Indeed, the

Notospartium—*continued.*

absence of *Leguminosæ* in New Zealand, in contrast especially with their great abundance in Australia, is the most singular feature in the Flora of the Island" (Hooker). It succeeds in a peaty soil, but can also be well grown in turfy loam. No doubt the plant will prove quite hardy in many places in Southern Britain.

N. Carmichæliæ (Carmichael's).* *fl.* pink, rather small, in many-flowered racemes; calyx campanulate, truncate; standard obovate-obcordate, not auricled at the base; wings oblong, with an incurved auricle at the base, shorter than the keel. Branches slender; branchlets pendulous, whipcord-like. *h.* sometimes 20ft. 1883. (B. M. 6741.)

NOTYLIA (from *notos*, the back, and *tylos*, a hump; referring to a singular lump on the column). ORD. *Orchideæ*. A small genus of low, stove, tropical American Orchids. About eighteen species have been described; but probably several of these are merely varieties. Flowers mostly inconspicuous, racemose; sepals narrow, erect, or almost spreading; lip unguiculate and quite entire. Few of the species are seen under cultivation. They do best in small baskets full of peat fibre, potsherds, and sphagnum, or attached to a piece of teak with a little fresh sphagnum wired over base of plant.

N. albida (whitish). *fl.* greenish-yellow, small, disposed in dense pendulous racemes 6in. long. April. *l.* cuneate-ligulate, oblong, obtuse, acute. Pseudo-bulbs cæspitose, small, compressed, one-leaved. *h.* 6in. Central America, 1851. (B. M. 6311.)

N. bicolor (two-coloured). *fl.*, sepals white; petals lilac, with blue spots at base, wider than the sepals; lip same colour as petals, free; spikes drooping, 2in. to 3in. long. *l.* about five, equitant, stiff, scimitar-shaped, half the length of the flower-spikes. Guatemala, 1866. (B. M. 5609.)

N. bipartita (bipartite). *fl.* numerous, similar to those of a Dendrochilum. Mexico, 1880.

N. punctata (dotted). *fl.* yellow, green; sepals and petals obtuse; lip obcuneate, unguiculate, acute, callous at base. *h.* 6in. Trinidad, 1822. (B. R. 759, under name of *Pleurothallis punctata*.)

NUCLEUS. The central part of the ovule in which the embryo is engendered.

NUNNEZHARIA. *See* **Chamædorea.**

NUNNEZIA. *See* **Chamædorea.**

NUPHAR (from *Naufar*, or *Nyloufar*, the Arabic name of *Nymphæa*). ORD. *Nymphæaceæ*. A small genus (three or four species) of very beautiful aquatic, perennial herbs, inhabiting the extra-tropical regions of the Northern hemisphere. Flowers yellowish, rather large; calyx of five or six concave, coriaceous sepals; petals many, small; stamens numerous, in several rows, ultimately bent backwards. Leaves peltate, floating. Nuphars are perfectly hardy, and thrive either in still or in running water. Although they are sometimes found at much greater depths, they perhaps succeed best when their stout rootstocks are planted in mud, with from 6in. to 12in. of water above them. If the roots are fastened inside loosely-made wickerwork baskets of rich soil, and these placed under water in the spots where it is desired to have the plants grow, no difficulty will be experienced. Unless the newly-planted rootstocks are firmly fixed, they frequently float to the surface of the water; but, when treated as above suggested, the roots soon form and fix themselves in the mud outside the baskets in which they have been placed. *N. pumilum* is a charming little plant, a much smaller grower than either *N. advena* or *N. luteum*, and, therefore, suitable for small pieces of water where those species would prove too large. All should be planted in full sun, as, although the plants grow freely enough in shade, they only produce flowers when allowed the full benefit of sunlight.

N. advena (stranger).* *fl.* yellow, with red anthers, large, on round stalks; sepals six; petals many, small, shorter than the sepals, never exceeding the stamens. Summer. *l.* erect, cordate, with divaricated lobes, on half-round petioles. The leaves and flowers of this species rise considerably above the surface of the water. 1772. (B. M. 684, under name of *Nymphæa advena*.)

N. Kalmiana (Kalm's). A synonym of *N. pumilum*.

Nuphar—*continued.*

N. luteum (yellow).* Yellow Water Lily. *fl.* yellow, with a brandy-like scent, on stalks rising a little above the surface of the water; sepals five; petals very numerous; stigmas entire, ten to thirty-rayed, profoundly umbilicated. Summer. *l.* 8in. to 12in. across, orbicular, deeply two-lobed at base; lobes usually contiguous. The rootstock abounds in tannic acid. See Fig. 701. (Sy. En. B. 54.)

FIG. 701. NUPHAR LUTEUM.

N. pumilum (dwarf). *fl.* ½in. to 1in. across when fully outspread; stigma rays eight to ten, reaching the margin. *l.* oblong, deeply two-lobed at the base; lobes at length spreading. SYN. *N. Kalmiana.* (B. M. 1243, under name of *Nymphæa Kalmiana*; Sy. En. B. 56.)

NUT. *See* **Corylus.**

NUT. A hard, indehiscent pericarp, usually containing only one seed.

NUTANS. Nodding; *e.g.*, the flowers of the Snowdrop.

NUTMEG. *See* **Myristica fragrans.**

NUTMEG, CALABASH. *See* **Monodora Myristica.**

NUTTALLIA, of Torrey and Gray (named after Thomas Nuttall, a celebrated North American botanist; he died in 1859). ORD. *Rosaceæ.* A monotypic genus. The species is a small, ornamental, hardy, deciduous shrub, growing freely in almost any garden soil, and, where seeds cannot be procured, is easily increased by means of the suckers which spring plentifully from the roots.

N. cerasiformis (Cerasus-like).* *fl.* white, small, polygamo-dicecious, in axillary, drooping racemes; stamens fifteen. Early spring. *fr.* Plum-like, with a purple bloom. *l.* obovate, entire. *h.* 5ft. California, 1848. An extremely pretty plant, of nearly globose habit, branching freely, and producing flowers in abundance. (G. C. n. s., xix. 309.)

N. cordata. *See* **Callirhoe triangulata.**

N. digitata. *See* **Callirhoe digitata.**

N. Papaver. *See* **Callirhoe Papaver.**

NUTTALLIA (of De Candolle). A synonym of **Nemopanthes** (which *see*).

NUT-TREE. The common name for **Corylus Avellana** (which *see*).

NUT-WEEVIL (*Balaninus nucum*). It has probably occurred to most persons, when eating Hazels or Filberts, to find some of the shells filled with a black, nauseous powder, instead of with the healthy kernel; or, occasionally, a fat, white maggot may be found feeding on the kernel. The cause of these disappointments is the Nut-Weevil, a curious-looking beetle (see Fig. 702), remarkable for the length and slenderness of its beak, on the middle of which are situated the antennæ. The beetle is about ¼in. long. The body is egg-shaped; it is dark brown or black, but is covered with grey, yellowish-grey, or white hairs, which form irregular, oblique, paler spots on the shoulders, and on the wing-covers. The hairs can be readily rubbed off, leaving the dark ground colour visible. The beak is red-brown; it is a little thickened towards the tip, but beyond the antennæ it curves downwards, slightly in the male, strongly in the female. The antennæ have a long joint

Nut-Weevil—*continued.*

at the base, followed by a number of short ones; the end ones are thicker, so that they form a knob at the tip. There is a sharp bend, like an elbow, formed just at the tip of the long joint (see Fig. 702).

In June, when the nuts are about half-grown, the female Weevils may be found boring holes in the still soft nutshell. One egg is laid in each nut, and it is pushed, by aid of the long beak, into the nut. The hole very quickly closes up, and hardly a scar even can be detected. From the egg emerges a little grub, which feeds upon the seed or kernel, and leaves, in its stead, only a mass of dark, powdery excrement. The grub is yellowish-white, wrinkled, and footless, and lies curled round on one side. Its head is small, and yellowish-brown. When full-fed, it eats a round hole through the shell of the nut, falls to the earth, and burrows under it, there to become a pupa. The beetles emerge from the soil in May of the following year; and, for a time, they feed on the young buds of the Hazel-bushes.

Remedies. When the nuts are attacked, the grubs cannot be detected or removed, except when the nuts fall from the bushes. The latter should be well shaken during the autumn, occasionally; and all the nuts that fall should be gathered and burned, before the grubs come out. In April, and the beginning of May, gas-lime

FIG. 702. NUT-WEEVIL AND GRUB.

or soot may be scattered below the bushes, in preparation for the beetles coming up from the soil. Beating the bushes in *dull* weather will cause the beetles to fall from the branches; and tarred boards, or other appliances, to prevent their escape, should be placed below, to receive them when they fall; or they may be swept up *at once* from cloths laid on the soil. It is well not to allow wild Hazel-bushes to grow near plantations of cultivated Hazels or Filberts.

NUYTSIA (named after Peter Nuyts, a celebrated Dutch navigator, and discoverer of that part of Australia called Nuytsland). Fire-tree. ORD. *Loranthaceæ.* A monotypic genus. The species is a very glabrous, showy, greenhouse tree, differing much from its near allies, *Loranthus*, &c., in being terrestrial and not parasitical. It would probably thrive in a compost of sandy peat and fibry loam; but, so far, it is believed, the plant has not been successfully grown in this country.

N. floribunda (many-flowered). *fl.* orange; racemes 6in. to 8in. long, crowded at the tops of the branches, simple; peduncles longer than the flowers, bearing each three bracts and three flowers at the apex; corolla nearly 1in. long. *l.* alternate, linear, obtuse, thick, 2in. to 3in. long. Branches terete *h.* 15ft. to 25ft. South-west Australia

NYCTAGINEÆ. An order of herbs, rarely shrubs or trees, inhabiting tropical and warm regions, mostly America, rarely found in Australia, very rare in Africa. Flowers hermaphrodite, rarely unisexual, regular, frequently disposed in paniculate or corymbose terminal and axillary cymes, very rarely solitary or racemose, sometimes umbellulate or capitate, often with a calyciform involucre; perianth small or minute, or rarely rather large, obscure or coloured; stamens one to many, hypogynous. Fruit various. Leaves opposite and alternate, sessile or stalked, simple, entire, penniveined. The roots of this order are endowed with purgative or emetic qualities; that of *Mirabilis Jalapa* (false Jalap) has the nauseous smell of the true Jalap, with which it was long confounded. The order comprises twenty-three genera and about 215 species. Examples are: *Abronia, Bougainvillea, Mirabilis, Nyctaginia.*

NYCTANTHES (from *nyx, nyctos,* night, and *anthos,* a flower; in allusion to the flowers opening at the approach of night, and falling off at the break of day). ORD. *Oleaceæ.* A monotypic genus. The species is an erect, spreading, stove shrub, or small tree, thriving in a compost of sandy loam and fibry peat, to which may be added a small quantity of sand and charcoal. Propagated, in May, by cuttings of half-ripened shoots, inserted in sand, under a bell glass, in bottom heat.

N. arbor-tristis. Tree of Sadness. *fl.* white, numerous, very fragrant, disposed in a large, terminal, leafy, cross-armed panicle, composed of small, five-flowered, terminal umbellets; corolla salver-shaped. July. *l.* on short petioles, cordate, acuminated, entire or coarsely serrated, scabrous. Branches tetragonal. *h.* 10ft. to 18ft. India, 1781. (B. M. 4900; B. R. 399.)

NYCTERINIA. A synonym of **Zaluzianskia** (which *see*).

NYCTERIUM. Included under **Solanum** (which *see*).

NYCTOCALOS (from *nyx, nyctos,* night, and *kalos,* beautiful; referring to the flowers and time of opening of the first-discovered species). ORD. *Bignoniaceæ.* A small genus (three species) of stove, scandent, tall shrubs, of which but one species is as yet introduced. The other two are natives of the Malayan Archipelago. Flowers few, on long peduncles; corolla tube very long, cylindrical; limb spreading, or two-lipped; lobes five, orbiculate. Leaves opposite, trifoliolate; leaflets entire, petiolulate. The species described below succeeds best when planted out in well-drained turfy loam and sand in the stove, and its long shoots trained near the glass in full light.

N. Thomsoni (Thomson's). *fl.* white, expanding at night and dropping the next morning; peduncles pendulous, bearing terminal cymes; corolla with a long, narrow, ascending tube, 7in. long, and a broad, Gloxinia-like, oblique limb. *l.* trifoliolate. Assam, 1868. (B. M. 5678.)

NYLANDTIA. A synonym of **Mundtia** (which *see*).

NYMPHÆA (from *nymphe,* a water-nymph; in reference to the habitation of the plants). Water Lily. SYN. *Castalia.* ORD. *Nymphæaceæ.* A rather large genus (about a score species) of handsome stove, greenhouse, or hardy aquatics, with a fleshy or tuberous rootstock. They are mostly distributed over the Northern hemisphere or the tropical regions, a few being found in South Africa or Australia. Flowers white, blue, or red, showy, solitary; sepals four, girding the base of the torus; petals numerous, adnate to the torus. Leaves large, profoundly cordate, or peltate, floating. The cultivation of Water Lilies is by no means difficult. The hardy ones may be planted on hillocks of turfy loam, decomposed manure, and rough sand, so that the crown remains from 6in. to 12in. below the surface of the water. Where it is impracticable to make a hillock, place the tubers in baskets of rich soil, and submerge these in the places where the plants are intended to grow. The stove species thrive in large pots, wherein a similar mixture of soil to the above should be used, but they require a house temperature of from 65deg. to 75deg., and the water heated to about the last-named figure; though several will succeed if kept much cooler. A full exposure to all the sun and light possible is recommended, supposing other plants grown in the house will bear it as well as the Nymphæas. As the leaves ripen, gradually lower the temperature of the water and the house, and allow the tubers to remain in the water until the time for repotting comes round—the following March. Some growers even dry off the roots, by gradually withdrawing all the water, and just keeping the soil moistened now and then, to prevent dry-rot, &c. Probably the first-named plan is the best. Propagated by seeds, which, in most cases, ripen freely. They should be sown in small pots of soil, and submerged in a shallow warm-water tank, in spring. The seedlings will grow away freely, if properly treated, and will flower well the same season.

Nymphæa—*continued.*

N. advena (stranger). A synonym of *Nuphar advena.*

N. alba (white).* Common White Water Lily. *fl.* white, scentless, floating on the surface of the water, 4in. to 6in. across; sepals four; petals from sixteen to twenty-four, in two or three rows, the outer ones having a green streak along the back. Summer. *l.* deeply cordate, entire, smooth. Europe (Britain), &c. See Fig. 703. Of this beautiful hardy species there is a very pretty rosy-pink variety, known as *rosea.* (R. H. 1879, 230, under name of *N. Caspary.*)

FIG. 703. NYMPHÆA ALBA.

N. amazonum (Amazon). *fl.* 3in. to 4in. in diameter, very fragrant; sepals yellow-green, purple at base; petals yellowish-white. *l.* sub-orbicular, cordate, obtuse, entire or sinuate-toothed, usually reddish beneath, 4in. to 12in. long. Jamaica. Greenhouse. (B. M. 4823.)

N. ampla (large), of Hooker. A synonym of *N. ampla speciosa.*

N. a. speciosa (showy). *fl.*, petals white or yellowish-white; exterior stamens much longer than the interior ones. July. *l.* cordate and a little peltate, sinuate-toothed, glabrous, usually purple beneath. Jamaica, 1801. Stove. (B. M. 4469, under name of *N. ampla.*)

N. cærulea (blue). A synonym of *N. stellata.*

N. Caspary (Caspary). A synonym of *N. alba rosea.*

N. dentata (toothed). A synonym of *N. Lotus dentata.*

N. Devoniensis (Duke of Devonshire's).* *fl.* brilliant rosy-red, from 5in. to 8in. across. Spring to winter. *l.* large, peltate. A most beautiful stove hybrid, between *N. Lotus* and *N. rubra.* (B. M. 4665; P. F. G. iii. 98.)

N. elegans (elegant). *fl.* fragrant, the size of the common Water Lily; sepals pale green, yellowish at base, and streaked with deep brown; petals twelve to fourteen, yellowish-white, tinged with purplish-blue; both oblong and obtusely acuminated. June. *l.* floating, about 6in. long, 4½in. to 5in. broad, purple beneath. New Mexico, 1850. Stove. (B. M. 4604.)

N. flava (yellow). *fl.* canary yellow, of medium size. Summer. *l.* oblong-orbicular, shallowly crenate, with slightly diverging, somewhat prolonged auricles at the base, irregularly blotched with a bronzy colour, especially in the early part of the season. Blade 4in. to 6in. long, and 3½in. to 5in. broad. Rhizome slender, forming numerous suckers. This species never becomes thoroughly deciduous, and, therefore, should never be dried off. South United States, 1881. Nearly hardy.

Nymphæa—*continued.*

N. gigantea (gigantic).* *fl.* of a beautiful blue, 6in. to 7in. across, with numerous petals and a dense mass of deep golden-coloured stamens, which form a striking contrast. Summer. *l.* peltate, smooth, dark green. Australia, 1852. A handsome greenhouse or stove species. (B. M. 4647.)

N. Kalmiana (Kalm's). A synonym of *Nuphar pumilum.*

N. Lotus.* Egyptian Lotus. *fl.* red or white, with the sepals red at the margins, large. Summer. *l.* peltate, sharply serrated; under surface pilose at the nerves, and pubescent between them. Tropics of Old World, 1802. Stove. This is the Lotos, which was celebrated by the ancient Egyptians, sacred to Isis, and was sometimes engraven on their very ancient coins. It is not to be confounded with the Lotos of the Lotophagi, which is supposed to be *Zizyphus Lotus.* The seeds, dried and ground, were made into a kind of bread by the ancient Egyptians, as were also the roots. Fig. 704 represents an abnormal condition, which appeared in the Paris Botanic Garden some years ago. From the axils of some of the floral leaves of an otherwise normal flower, have developed five flower-stalks (two being united), each bearing another flower; a very strange and interesting instance of prolification. (A. B. R. 503; B. M. 1280 and 1364, under name of *N. rubra.*)

N. L. dentata (toothed).* *fl.* pure white, very large, from 6in. to 14in. in diameter, many-petaled, produced in great profusion in

Nymphæa—*continued.*

Summer. *l.* peltate, bluntly and sinuately toothed, not dotted, smooth on both surfaces, two-lobed at the base; lobes incumbent. Cape of Good Hope, 1792. A handsome greenhouse or stove species, distinguished from *N. stellata* by its much larger and many-petaled flowers, and by the petals being more obtuse. (F. d. S. vi. 645.)

N. stellata (starry).* *fl.* blue, very delicately scented, produced in abundance throughout the summer months. *l.* peltate, nearly entire, without dots, glabrous on both surfaces, two-lobed at the base. Tropical Africa, 1812. A beautiful stove plant, which was probably held sacred by the Egyptians, and frequently represented on their old monuments and in hieroglyphics. (B. M. 552, under name of *N. cærulea.*)

N. s. cyanea (blue). Indian Blue. *fl.* blue. June to September. *l.* peltate. India, 1809. Stove. (B. M. 2058.)

N. s. versicolor (various-coloured). *fl.* white, changing to red; several of the outer petals are green, and furrowed on the back with green lines. Summer. *l.* peltate, with the margin and between the recesses sinuately toothed, full of pustules, glabrous on both surfaces. Bengal, 1807. Stove. (B. M. 1189, under name of *N. versicolor.*)

N. s. zanzibarensis (Zanzibar).* *fl.* intense blue; anthers with a shade of violet; sepals green outside and purple within.

FIG. 704. NYMPHÆA LOTUS, with Abnormal Inflorescence.

autumn. *l.* peltate, very large, serrated at the margins, often 2ft. in diameter. Sierra Leone, 1845. A magnificent variety. (B. M. 4257, under name of *N. dentata.*)

N. Lotus (Lotus), of Sims. A synonym of *N. thermalis.*

N. micrantha (small-flowered). *fl.* smaller than the common Water Lily; sepals four, pale yellowish-green; petals many, white or whitish. August. *l.* elliptic-rotundate, tinged underneath with pale purplish-brown. West Africa. Stove. (B. M. 4535.)

N. nitida (shining). *fl.* white, scentless, smaller than those of *N. odorata*; petals blunt. June. *l.* cordate, quite entire, nerves not prominent on the under surface; petioles smooth. Siberia. 1809. Hardy. (B. M. 1359.)

N. odorata (sweet-scented).* *fl.* white, tinged with red, sweet-scented, about 6in. across, expanding in the morning, but closing after noon; petals blunt. Summer. *l.* cordate, quite entire, with the nerves and veins on the under surface very prominent. North America, 1786. A handsome hardy species, very like *N. alba,* but quite distinct. (A. B. R. 297; B. M. 819.) There is a very handsome variety, with flowers faintly tinged with pink, called *rosea.*

N. pygmæa (pigmy).* *fl.* white, fragrant; petals acute; torus greenish-yellow. June to September. *l.* cordate, quite entire, nerves not prominent; petioles smooth. Central and Northern Asia, 1805. An elegant little hardy species. (B. M. 1525.)

N. rubra (red). A synonym of *N. Lotus.*

N. scutifolia (shield-leaved).* *fl.* bright blue, sweet-scented. Summer. Zanzibar, 1880. Stove. This is one of the most free flowering and beautiful of all the Water Lilies.

N. Sturtevantii (Sturtevant's).* A handsome garden variety, of American origin; a very floriferous large-flowered stove plant, with lighter-coloured blossoms than its parent, *N. Devoniensis.*

N. thermalis (hot-bath).* Hungarian Lotus. *fl.* pure white, having a somewhat vinous odour, very freely produced during summer. *l.* peltate, sharply toothed, glabrous on both surfaces. Hungary, in the warm river Pecze, 1802. Stove. (B. M. 797, under name of *N. Lotus*; F. d. S. vii. 706, 707.)

N. tuberosa (tuberous). *fl.* 4in. to 7in. across, very faintly scented; sepals and petals as in *N. alba* and *N. odorata.* July and August. *l.* circular, 8in. to 18in. in diameter, with an entire or undulated margin. Rootstock creeping, bearing oblong tubers. North-eastern United States. Hardy. (B. M. 6536.)

N. versicolor (various-coloured). A synonym of *N. stellata versicolor.*

NYMPHÆACEÆ. A small order of freshwater herbs, widely dispersed over the globe. Flowers mostly floating, showy, often on scapes which rise to some distance above the water; sepals three to six, petals three to many, and stamens six to many. Fruit sometimes emerging, sometimes maturing under water. Leaves rarely emerging from the water, often peltate, involute in vernation, the submerged ones not unfrequently dissected.

Nymphæaceæ—*continued.*

The order comprises eight genera and about thirty-five species. Examples: *Cabomba*, *Nelumbium*, *Nymphæa*, *Victoria*.

NYSSA (from *Nyssa*, a water-nymph; in allusion to the habitat of some of the species). Tupelo-tree. ORD. *Cornaceæ*. A small genus (five or six species) of mostly hardy trees or shrubs, inhabiting the North-eastern, temperate, and warmer parts of America, also the Eastern Himalayas, the Khasia Mountains, and the Malayan Islands. Flowers small, at the apices of the axillary peduncles, in crowded heads or shortly racemose. Drupe oblong. Leaves alternate, petiolate, entire, or the younger ones dentate-lobed. The species are not much grown in this country; their chief attraction is the intense deep scarlet colour which the leaves assume in the autumn. Nyssas thrive best in low, damp, moist situations, such as peat swamps. Propagated by imported seeds, and by layers.

N. capitata (capitate). Ogechee Lime. *fl.*, sterile ones capitate; fertile ones solitary, on very short peduncles. *fr.* an oblong drupe, red. *l.* large, shortly-stalked, oblong, oval, or obovate, mucronate or acute, tomentose beneath. Swamps of South United States. Small tree.

N. multiflora (many-flowered). *fl.* greenish; fertile peduncles 1½in. to 3in. long, slender, three to eight-flowered. May. *fr.* dark blue, ½in. long. *l.* rather thick, dark green, oval or obovate, mostly acute, tomentose when young, at length shining above, 2in. to 5in. long, turning bright crimson in autumn. *h.* 30ft. to 50ft. North America, 1824. SYN. *N. villosa.*

N. villosa (villous). A synonym of *N. multiflora.*

NYSSACEÆ. Synonymous with *Cornaceæ.*

OAK. Oak is the name indiscriminately given to any member of the large genus *Quercus*, which contains about 300 species, principally distributed over the temperate regions of the Northern hemisphere. Within the tropics, in America, Oaks occur on the mountains as far South as Columbia, and, in Asia, to the Malayan Archipelago. The genus is entirely absent from Africa (except the Mediterranean region), Madagascar, Australia, the South Sea Islands, &c.; and, so far, no Oaks have been found in New Guinea. Whether looked at from the standpoint of number of species, or from the value of a large number of them from a purely commercial point of view, the genus *Quercus* is by far the most important one in the family *Cupuliferæ*. As a forest-tree—at any rate, in the British Isles—the common Oak is that which undoubtedly occupies the first place. For landscape effects, too, on a large scale, the massive, rugged stems and twisted branches furnish an element of picturesqueness which is unique in character. Several of the exotic species, however, far surpass our native one in the brilliancy of the colours assumed by the decaying leaves in autumn, as well as in the rate of growth; many of the evergreen and sub-evergreen ones, too, are amongst the most beautiful of hardy trees. The British Oak (*Quercus Robur*) is found both in Europe and Asia, almost up to the Arctic circle. As might naturally be expected with such an extended geographical distribution, there are very many forms, some of which differ markedly from any found in this country. Of these latter, the two principal are *pedunculata*, with sessile leaves and long peduncles, and *sessiliflora*, with stalked leaves and very short peduncles. For convenience of reference, these forms are accorded specific rank under *Quercus*, and the principal garden forms are described under each.

The great age attained by the Oak is proverbial; the age of some of the famous old trees—the Cowthorpe Oak, for example—has been estimated at 1800 years. That just mentioned is, or was, the largest Oak in England. In the "Gardeners' Chronicle," n. s., vol. xvi., p. 134, the following particulars are given respecting this tree. It may, however, be better to state that the Oak in question is growing near Wetherby, in Yorkshire, but that its ruins

Oak—*continued.*

only now remain. The circumference at 3ft. from the ground, in 1776, was 48ft. The height of the tree as a ruin was 85ft.; in 1880, the writer of the article on "Tree Lore," from which the above data are gleaned, noticed that the old tree still had a few green leaves. The following quotation was given in a Nottingham paper, two years ago, in reply to inquiries respecting "the present condition of the trees of Sherwood Forest." The information is contained in an article by Mr. W. Senior, in Cassell's "Picturesque Europe," on "The Forest Scenery of Great Britain," in which that writer states, that at Welbeck there is the Greendale Oak, which is estimated by one authority to be 700, and by another 1500, years old. "This Oak is probably the Methusaleh of his race, although it may be noted that there are few forests which do not, through their local historians, advance plausible claims for a like distinction. The Greendale Oak, nearly 150 years ago, was deprived of its heart by the eccentric desire of a former owner to make a tunnel through the trunk. This novel piece of engineering was effected without any apparent injury to the tree; an opening was made, through which a Duke of Portland drove a carriage and six horses, and three horsemen could ride abreast. This arch is 10ft. 3in. high, and 6ft. 3in. wide. A cabinet, made from the excavated Oak wood, for the Countess of Oxford, is one of the curiosities of Welbeck Abbey (the seat of the Duke of Portland). It is ornamented with a representation of this grand old tree, which is now shored and supported against the elements, before which it must, ere long, succumb. The Spread Oak of Thoresby extends its arms over 180ft. of ground, and can give shelter to 1000 horsemen. In the hollow of Major Oak, seven persons have dined with comfort; and that, of course, is impossible without unrestricted elbow-room. This tree is remarkably perfect in form, the true type of a sturdy Oak that is still prepared to brave the battle and the breeze."

It would be out of place here to dilate upon the value of English Oak; but the following data respecting its durability may be of interest. In the Museum No. 1 at Kew is a block of Bog Oak, a portion of a tree found below the Roman (Hadrian's) Wall, in cutting the canal from Carlisle to the Solway Firth, in 1823. According to Bruce's "Roman Wall," a quantity of posts and rails were made of the trunks, and used for fences. There is also a portion of a pile of old London Bridge—apparently as sound as it was the day it was first worked—taken up in 1827, after having been in use about 650 years. Amongst other interesting specimens is a part of an Oak beam from the Council Chamber in the White Tower, Tower of London; this is supposed to be coeval with the building of the Tower of London by William Rufus, and the adze-marks of the woodmen or builders of that period are distinctly visible.

Cork is obtained from the thick bark of *Quercus Suber*, a common South European Oak. Kermes is the insect which yields a scarlet dye nearly equal to cochineal, and is the "scarlet" mentioned in Scripture; it feeds on *Q. coccifera*, an Oak from Asia Minor, &c. The acorn cups of *Q. Ægilops* are largely imported from the Levant for the purposes of tanning, dyeing, and making ink. The Oak Galls of commerce are yielded by *Quercus infectoria*, also a native of the Levant; these are much more rich in tannin than those produced in this country. *See also* **Quercus.**

Insect Pests. The number of these is legion. In Kaltenbach's "Pflanzenfeinde," there are 537 species of German insects recorded as living, more or less, on Oaks, and the number might be largely increased were the compilation continued up to the present date. Many of them, it is true, live habitually upon other trees, and on shrubs, only occasionally attacking Oaks, and

Oak—*continued.*

seldom doing very great harm to the latter; yet even they may at times do great damage to Oaks, such as the larvæ of various moths (*see* **Hybernia, Lackey Moth, Liparis, Orgyia antiqua,** &c.) to the leaves; Cockchafer grubs, Mole Crickets, &c., to the roots; *Balaninus nucum*, or Nut-Weevil, in the fruit, &c. It may, indeed, be said that no part of the tree is safe from the attacks of insect foes; but it is impossible here to do more than mention a few of the more interesting and important of these. Several beetles (*see* **Tomicidæ**), *e.g.*, *Platypus cylindrus*, *Xyleborus dryographus*, &c., and some moths (*see* **Goat Moth**) bore into the wood, and render it unfit for use; but, fortunately, they seldom attack healthy trees. As a precaution against them, all the dead trunks should be removed, and dead branches should be destroyed. The other moths above mentioned are hurtful by consuming the leaves of Oaks, Beech, and many other trees. But even more thorough in the extent of its ravages is a small moth (*Tortrix viridana*), which almost restricts itself to the common Oak. It reaches about ¾in. in the spread of the front wings, which are green. The larvæ live for a time in the buds, then in the leaves, and pupate in leaves spun together, or in the soil. In some seasons, and in certain localities, hardly a leaf is allowed to remain on the trees. Shaking the branches over sheets laid on the ground will cause the larvæ of all the moths to fall on to the latter, from which they may be swept up and destroyed. The same method may be employed for the capture of various kinds of small beetles, chiefly Weevils, that gnaw the leaves and buds, as well as of Cockchafers, which, at times, do considerable damage to the trees.

The leaves are frequently mined by the larvæ of small moths and beetles, but the injury from this cause is too slight to call for discussion at present; and, for the same reason, the larvæ that feed in the buds may be passed over in silence. Among the more frequent causes of injury to the acorns is the beetle *Balaninus nucum* (*see* **Nut-Weevil**). Numerous species of Green Fly attack the Oak, and, at times, must weaken the trees very greatly, covering the lower leaves with honeydew, among which grows the Fungus *Capnodium quercinum* (*see* **Oak Fungi**), which may, in some cases, prove hurtful to the trees. But, of all the insects that attack Oaks, probably the most striking, in respect to the effects produced by them, are the makers of the various Galls so frequent and so noticeable on Oak trees. *See* **Oak Galls.**

OAK APPLE. *See* **Galls** and **Oak Galls.**

OAKESIA (of Tuckerman). A synonym of *Corema.*

OAKESIA (of Watson). Included under **Uvularia** (which *see*).

OAK FERN. *See* **Polypodium Dryopteris.**

OAK FUNGI. The species of Fungi that live upon the common Oak are numerous; but by far the larger proportion either do comparatively little injury, or make their appearance only on dead parts of the trees; *e.g.*, on bark or wood of dead branches, or on leaves or acorns. Many of the species are very minute, but only a few of the more injurious will be mentioned here. Those of chief importance belong to the *Hymenomycetes* (*see* **Mushrooms**), and, for the most part, to the genus *Polyporus*, which has pores instead of gills on the lower surface of the cap, or spore-producing structure. The following are among the more noteworthy species, inasmuch as their mycelium traverses the living wood of the Oak, and withdraws the nourishment from the cells of the wood, which, in consequence, becomes decayed and brittle. The cap, in most of the species, grows to a breadth of several inches. Of *Polyporus*,

Oak Fungi—*continued.*

several species attack living wood of Oak, *e.g.*, *P. dryadeus*, *P. sulphureus*, *P. igniarius*, and *P. intybaceus*; so also does the nearly-allied *Fistulina hepatica*, or Beefsteak Fungus. In each case, the mycelium of the Fungus usually gains entrance by the uncovered end of a branch, or a wound, and spreads through the wood cells. Careful pruning, and protection of wounds by tar, or some other dressing, are of very great service in preventing the entrance of mycelium, and the consequent development of the Fungus, with its disastrous results to the trees. The methods of pruning, and of protecting wounds, cannot be treated of under this head, but will be found fully described in this work under the appropriate headings. Trees suffer much injury from Fungi in their roots, which become attacked by the mycelium spreading in the soil from adjoining roots of dead trees; hence, care should be taken to remove, as far as possible, all decaying wood from soil in the neighbourhood of healthy trees, lest the Fungi should extend to the roots of the latter, and, after a time, cause their destruction. Trees, when badly attacked by these Fungi, should be cut down and destroyed, to prevent the spread of the Fungi to healthy trees. *See* **Polyporus.**

A soot-like crust very frequently covers the leaves of Oaks, as well as of many other trees and shrubs. When examined microscopically, it is seen to be formed of cells and threads of a Fungus, belonging to a group included under the name *Fumago*, called also, when fully developed, *Capnodium*. In *Capnodium*, the spores for reproduction are produced in the interior of larger cells (asci), many of which are inclosed in a globular or flask-shaped vessel (perithecium), of microscopic size; but this stage of development is not often met with. The *Fumago* stage is much the more common. In this, the reproductive cells are separated from the tips of threads on the exposed surface, or are produced in minute flask-like perithecia, but not in asci. The crusts are much like soot in general appearance, like it, resting only on the upper surface of the leaves. They have frequently been attributed to injury from smoke, leading more than once to lawsuits for compensation for such alleged injury. The microscope shows the cell walls to be dark brown.

The Fungus is readily removable from the leaves by rubbing the surface. It does not seem to derive nourishment from them—at least, to any marked extent—but feeds in large degree, probably, on the honeydew excreted abundantly by various kinds of Aphides, or Green Flies. As these insects live on the lower surface of the leaves, their excretions fall on the upper surface of leaves below them, which explains the presence of the Fungus on that surface. If present only in small amount, the crust does not seem to do much injury to the trees; but when thick, it partially chokes the leaves, and cuts off the light from them, so that they become sickly, and fail to nourish the trees. This seldom occurs before autumn, which is fortunate, as there is hardly any practicable method of removing Fungi from trees such as Oaks. The species found on Oak has received various names, that generally adopted being *Capnodium quercinum*.

OAK GALLS. Very noticeable, because of their size, the peculiarities of their forms and colours, and the distortions and alterations that they occasionally produce on various parts of Oaks, are the Galls, so frequently seen by even the least observant spectator who passes an Oak-tree in autumn. The development of the Galls, and of their makers, is now believed to be very peculiar in certain respects in the case of most of them; but only a few of them are here selected as examples. Galls are new structures budded out from stems, leaves, or other parts of plants, under the influence of a stimulus applied

Oak Galls—*continued.*

either by lower plants (Fungi), or by animals, which produce the Galls either for the protection of their young and immature larvæ, or for their own protection at all stages of development. The makers of Oak Galls belong almost entirely to the great group of *Hymenoptera*, known as *Cynipidæ*, or True Gall Flies, almost the only exceptions being a few Midges, which merely fold down the lobes of leaves, making them become fleshy.

The *Cynipidæ* are all of small size, seldom exceeding ¼in. in length, with a rather greater spread of wing. They vary a good deal in colour—from reddish-brown to black—and frequently show metallic reflections. The wings are supported by a few nerves. The females possess, at the end of the abdomen, an ovipositor, and, by means of this organ, which is frequently of considerable length, they bore into some parts of the tree, and thereby give rise to the "Gall."

Galls are found growing from every part of Oak-trees, from roots and branches, to leaves, stamens, and ovaries, or fruits; and, in harmony with such diversity of situation, they vary exceedingly in their appearance, consistency, and internal structure; but all those of the *Cynipidæ*, or Gall Flies, in the strict sense, to which almost all the Gall-makers in the Oak belong, agree in this, that there is a central space, with walls in which the cells immediately around the space usually contain starch; while outside this layer there is generally another, for defence, formed of thick-walled, compact cells. In the central cavity lies the single, footless, pale grub of the Gall Fly; or, if the intruders have destroyed the host larva, two or more larvæ of the parasites may be found in each Gall, generally inclosed in separate chambers. In many of the rounded Galls there is also a considerable layer of beautifully arranged cells (spongy tissue) in the walls. Galls on the roots require to be specially sought for, because of their being concealed under the soil.

FIG. 705. OAK GALLS.

A, Gall of *Dryoteras terminalis* (Oak Apple), about two-thirds natural size.

B, Young Root of Oak, bearing Galls of *Biorhiza aptera*, about two-thirds natural size. These Galls vary much in size, and are often crowded into a mass, and fused together. When fresh, they are red, and rather fleshy; but, in drying, they become dark brown and hard. They are believed to be the autumn form of the cycle to which "Oak Apples" belong as the summer form. The insects that emerge from them are all wingless females.

The Gall of *Biorhiza aptera* (see Fig. 705) is one of the commonest. The others do not call for further notice here. Galls on the main stems are not very numerous. Far more conspicuous and important are those formed on the branches. Many of these are modified buds; numerous others are conspicuous Galls formed upon the leaves, usually on their lower surface; and still others are stamens or ovaries, changed in structure by the

Oak Galls—*continued.*

punctures of the parent insects. On the Continent of Europe, nearly 100 different forms of Galls have been found on Oaks; and in Britain, the number of forms already observed reaches nearly forty. Among the more widely-known Galls may be mentioned the Oak Apple (see Fig. 705), found, in May and June, on the twigs, as an oblong mass, from 1in. to 2in. long, covered with a smooth, green and red skin, above a layer of soft tissue, in which are imbedded numerous larvæ, each one in a hard-walled cell or chamber in the centre of the Gall. The Cotton Gall resembles a ball of white cotton wadding surrounding a number of minute thin-walled chambers, each occupied by one larva of small size. The whole mass may reach a size of 1in. or more across, and is very conspicuous, as it hangs attached to the male catkins in May and June. The Devonshire, or Marble, Gall of the Oak is very easy to recognise, as it is about the size and form of a boy's marble, green and soft when young, but brown and hard when mature. Two or more of the Galls often join together during growth, and form irregular masses. In the centre is a small cavity, inhabited by the larva. It is said that this Gall was introduced from the Continent, and was first observed in Devonshire; but, whatever its origin, it is now abundant in many parts of Britain. Experiments have not succeeded in rearing males, but have yielded many female Gall insects from these Galls, and, along with them, seventy or more kinds of insects that live in the Galls, either as guests (inquilines) or as true parasites. The name of the Gall-maker is *Cynips Kollari*. The Artichoke Gall, formed by *Aphilothrix gemmæ*, very much resembles a miniature Artichoke, about 1in. long, formed of scales, with a central chamber like a small acorn. Various kinds of bud Galls are too small to be found without careful search, and are of interest chiefly because of the relation of some of them to other conspicuous forms that disfigure young Oak-trees in pleasure grounds.

The leaves bear many curious forms of Galls, some of them so conspicuous that they cannot have escaped the notice of even the least observant. One that causes

FIG. 706. OAK GALLS.

A, 1, Cluster of Galls of *Andricus curvator* in Oak Leaves, about natural size; 2, Gall in Transverse Section, showing small inner Gall.

B, Oak Twig, with two Galls of *Aphilothrix collaris*, natural size.

much damage is the work of *Andricus curvator* (see Fig. 706). It is produced on the midrib, or leafstalk, and causes a marked bend, or twist, in the leaf, or at its base in the branch; the Gall forms a green swelling, about the size of a pea. Inside this lies a small, brown, kidney-shaped inner Gall, which, when ripe, is quite free from the inside of the wall of the large chamber. The Currant Galls, resembling translucent currants, pale, with purple or red mottlings,

Oak Galls—*continued.*

and very juicy, are common, in May and June, on the lower surfaces of leaves, and on catkins, where they

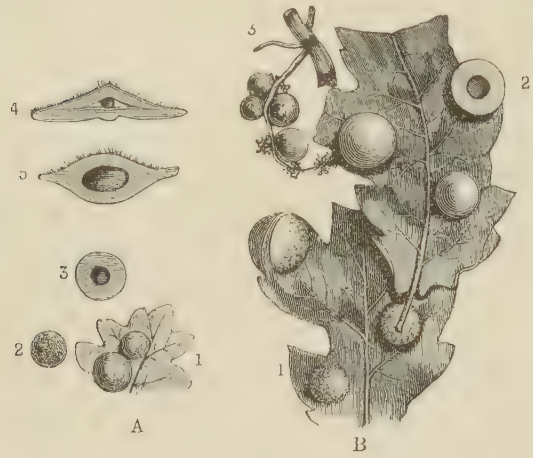


FIG. 707. OAK GALLS.

A, Galls of *Neuroterus lenticularis* (Oak Spangle Galls)—1, On Lower Surface of Leaf; 2, Removed from Leaf; 3, Flat Section, showing round Chamber in centre where the Larva lives; 4, Transverse Section, in autumn, showing Form while still on the Leaf, with very small Chamber; 5, Transverse Section of Gall in following spring, showing changed Form and much larger Chamber. (Nos. 4 and 5 are about four times enlarged.)

B, Galls of *Spathegaster baccarum* (Currant Galls of Oak)—1, Upper Surface of Leaf, showing Galls projecting through; 2, Lower Surface of Leaf, showing three Galls, of which the Upper is cut through to show the Larval Chamber; 3, Male Catkin bearing Galls. (All the figures are a little smaller than natural size.)

look like bunches of Currants (see Fig. 707). The insects (*Spathegaster baccarum*) are easily reared from these Galls,

FIG. 708. OAK GALLS.

A, 1, Galls of *Dryophanta folii* on Lower Surface of Oak Leaf, slightly smaller than natural size; 2, Transverse Section, showing Larval Chamber.

B, 1, Galls of *Spathegaster Taschenbergi* on a Young Twig, natural size; 2, Gall enlarged. These Galls are violet, with a velvety surface, are soft, and are eaten by the larva till the wall becomes very thin. They appear in May and June; and, though not recorded from Britain, are believed to be the Galls that complete the cycle with those of *Dryophanta folii*.

if the latter are collected when fully mature, and prevented from becoming either too dry or mouldy. *Dryophanta folii* produces a globular Gall on the backs of leaves. It may reach ⅜in. in diameter, but the central chamber is small, the walls being thick, though soft and spongy. The surface becomes yellow and red. See Fig. 708. *Dryophanta divisa* also forms Galls on the lower surface of leaves, but the Galls are generally flattened, oval bodies, much smaller than the last-named, with harder, but thinner, walls. They are also more abundant throughout the country. Oak Spangles are among the most curious of Oak Galls. They occur on leaves, almost always on the lower surface. Three kinds have been distinguished in Britain, agreeing in being circular, about ⅛in. across, and, while on the leaf, quite thin, though bearing a very slight prominence in the middle. The commonest is covered with rusty brown hairs; it often nearly covers leaves. See Fig. 707. Of the other two, one bears similar scattered hairs, and has the margin turned up; while the third is green or purple-red, and smooth. All are the work of insects belonging to the group *Neuroterus*, and which are named *N. lenticularis*, *N. læviusculus*, and *N. fumipennis*. Another species of this genus (*N. numismatis*) makes Silky Button Galls, so called from their resemblance to tiny, round, flattened

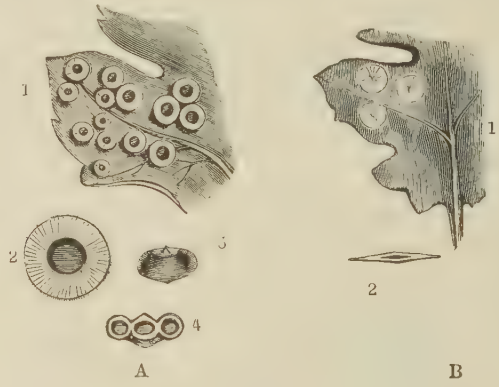


FIG. 709. OAK GALLS.

A, Galls of *Neuroterus numismatis* (Silky Button Galls of Oak)—1, Lower Surface of Leaf, bearing many, about natural size; 2, Gall showing the depressed Surface, enlarged; 3, Gall seen from the side; 4, Gall in Section, showing small central Chamber for Larva, hollow Border cut through at each side, and short Footstalk.

B, 1, Three Galls of *Spathegaster vesicatrix* (Blister Galls of Oak Leaves) in a Leaf, natural size; 2, Transverse Section of Leaf, with Gall, showing very small Larval Chamber.

buttons, covered with brown silk threads (see Fig. 709). These Galls are often formed in myriads on the lower surface of the leaves, so as, in some cases, to cover it almost entirely in autumn. Yet another Gall, of very frequent occurrence, is so inconspicuous as to be easily overlooked in the leaves, in which, during June, it looks like a mere low blister, about ⅛in. across (see Fig. 709). The insects reared from these Galls have been named *Spathegaster vesicatrix*. This may be called the Oak Blister Gall.

In acorns, at times, Galls are to be found in the seed, though the outside of the acorn shows no sign of insect work. The interior is broken up by numerous small oval spaces, in each of which lives a small larva of the Gall-maker (*Andricus glandium*).

These brief notes must suffice for the more common forms of Oak Galls; and attention must now be directed for a little to certain points in the life of the Gall-makers—points which, for a considerable time, seemed to defy explanation, but which are gradually emerging into the light, thanks to the careful experiments and observations of

Oak Galls—*continued.*

entomologists, pre-eminent among whom stands Dr. Adler. The following are two very noteworthy peculiarities connected with many Oak Galls: (1) From certain kinds, *e.g.*, Devonshire Gall, Oak Spangles, &c., females alone have been reared (sometimes in thousands), while from others males as well as females are readily obtained in confinement. Where females alone emerge from Galls, they lay eggs that produce larvæ, though unimpregnated. But we can hardly imagine that this mode of reproduction can go on perpetually without requiring to be re-invigorated by the influence of males. (2) Certain kinds of Galls appear only in early summer; *e.g.*, Currant Gall, Blister Gall, and Oak Apple. The insects emerge from the Galls in June or July, and may be observed to lay their eggs at once on the twigs, buds, or leaves; yet no trace of the Galls can be seen before the succeeding spring. In like manner, many Galls are met with only in autumn, *e.g.*, Oak Spangles, Silky Button Galls, &c., and the insects emerge from them in spring, lay eggs on the Oaks, and disappear; but the Galls re-appear only in autumn.

The insects reared from each form of Oak Gall are distinguishable, by an expert, from those reared from every other form, the differences affecting form and size of the ovipositor, wings, and other important organs, as well as such minor points as colour. Formerly, it was very difficult to understand alike the constancy with which only females emerged from some Galls, and the (supposed) length of time between the puncture of the plant by the parent Gall Fly, and its result in the formation of a Gall, some months later. The explanation of both difficulties now seems afforded to us in the discovery, first announced from the United States by Mr. Walsh, in 1870, but chiefly wrought out and enforced in its application to the life-history of Gall Flies (*Cynipidæ*) by Dr. Adler. This explanation is, that most of these insects appear in two annual broods; that these broods differ from one another in the Galls formed by them, as well as in the structural characters of the mature insects; in short, that the insects and their Galls alike are dimorphic—a unisexual brood appearing in winter or spring, laying eggs, though unimpregnated, and producing Galls in early summer, from which emerge, in a month or two, insects differing so much from their parents (makers of the Galls) that they have been referred to genera different from the latter. The later brood possess males as well as females: these pair, and the females produce Galls similar to those with which the cycle was begun. Such a cycle has now been traced in many of our native Gall Flies. Subjoined are noted only five such cycles, all figured above, since even to enumerate all the cases would exceed the space available here. The two forms of Galls are, in each case, placed in the same line, the spring or early summer form to the left, the autumn form to the right. They are as follows:

Andricus curvator.	*Aphilothrix collaris.*
Dryoteras terminalis.	*Biorhiza aptera.*
Spathegaster baccarum.	*Neuroterus lenticularis.*
Spathegaster Taschenbergi.	*Dryophanta folii.*
Spathegaster vesicatrix.	*Neuroterus numismatis.*

It is at once evident that, if this theory of the existence of dimorphism among Oak Gall Flies be true, it sufficiently explains the problems, stated above, in regard to unisexual insects alone being reared frequently, and to the supposed interval between the puncture and the formation of the Gall.

Remedies. It is seldom necessary to take active means to reduce the numbers of Oak Galls, although, at times, the lower surface of the leaves—almost every square line upon it—bears one or more Galls, such as Oak Spangles and others of the smaller kinds. Their presence does not seem to weaken the trees very materially—a fortunate circumstance, since remedies could scarcely be applied with success to huge trees, or even to Oak-bushes. Almost the only Gall deserving to be mentioned as distorting twigs and leaves, is the work of *Andricus curvator.* The supposed second stage of this Gall is a tiny egg-shaped excrescence, half hidden among the leaf scales in buds; the insect reared from it has been named *Aphilothrix collaris.* Where so many occur as to injure the plants, the best remedies are to hand-pick and to destroy the Galls. Another Gall that occasionally distorts the branches of Oaks, though much less often than the last-mentioned kind, is that of *Andricus inflator:* it is a swelling at the tips of the young twigs. In the centre is a cup-shaped hollow, closed above by a thin membrane; and at the bottom of the hollow is a small, ovate, brown, very thin inner Gall. The insects emerge in July, and there are both males and females amongst them. The Gall believed to alternate with this is globular, scarcely over ¼in. across, green, and smooth; and is formed in the buds in autumn, remaining concealed in the bud scales. The insects emerge in early spring, are all females, and have been named *Aphilothrix globuli.*

OAT, or **OATS.** *See* **Avena.**

OB. This term, used in the composition of Latin technical terms, signifies inversion; *e.g.*, *obovate* means inversely ovate; *oblanceolate,* inversely lanceolate, &c.

OBCOMPRESSED. Compressed, so that the two sutures of a fruit are brought into contact; flattened, back and front.

OBCONICAL. Inversely conical.

FIG. 710. OBCORDATE AND RETUSE LEAF.

OBCORDATE. Inversely cordate. An Obcordate and retuse leaf is shown at Fig. 710.

OBELISCARIA. Included under **Rudbeckia** (which *see*).

OBERONIA (so called after Oberon, the Fairy King, in allusion to the quaint and variable forms of the plant). ORD. *Orchideæ.* A genus comprising about fifty species of stove, epiphytal, tufted Orchids, natives of tropical Asia, Australia, and the Mascarene and Pacific Islands. Flowers small, in numerous dense, subcylindrical racemes, or spikes, sessile, or shortly pedicellate; sepals free, sub-equal; petals narrower, or shorter, than the sepals; lip sessile, usually concave. Leaves distichous; sheath compressed, equitant. The species are of botanical more than horticultural interest. Those described below will grow attached to blocks of wood, suspended near the glass, in a warm, moist house. Care must be taken to guard against superfluous moisture, both at the root and in the air, especially during winter. Propagation is effected by dividing the tufts.

O. acaulis (stemless-leaved). *fl.* orange, numerous, on a long, cylindrical raceme; sepals and petals uniform, ovate, singularly reflexed; lip sub-quadrangular, three-lobed, the middle lobe bilobed; column very short. Spring. *l.* stemless, few, the longest 1ft. long, ensiform, falcately recurved, long-acuminate. Eastern Bengal. (B. M. 5056.)

O. iridifolia (Iris-leaved). A synonym of *O. tahitensis.*

O. tahitensis (Otaheite). *fl.* yellow, very numerous, verticillate; sepals reflexed, ovate, equal; petals reflexed, erose; lip erect, with a fimbriated, involute margin. June. *l.* ensiform, similar to those of an Iris, drooping or pendulous, sometimes longer, sometimes shorter, than the raceme. Pacific Islands, 1840. (B. M. 4517, under the name of *O. iridifolia.*)

OBESIA. A synonym of **Podanthes** (which *see*).

OBLIONKER-TREE. A common name of *Æsculus Hippocastanum.*

OBLIQUE. Unequal-sided, or slanting.

OBLONG. Elliptical, and obtuse at either end; *e.g.*, the leaf of some species of *Rumex, Sedum,* &c.

FIG. 711. OBOVATE LEAF.

OBOVATE, or **OBOVOID.** Inversely egg-shaped, with the broadest end uppermost. An Obovate leaf is shown at Fig. 711.

OBSOLETE. Hardly evident.

OBTUSE. Blunt, or rounded.

OBVERSE. A term applied in precisely the same manner as **Ob** (which *see*).

OBVOLUTE. Having one part rolled upon another.

OCELLATED. When a broad round spot of one colour has a different-coloured spot within it.

OCHNA (from *Ochne*, the old Greek name, used by Homer, for the Wild Pear, to which the foliage of this genus bears some resemblance). ORD. *Ochnaceæ.* A genus comprising about twenty-five species of stove, evergreen shrubs, natives of tropical Asia and tropical and Southern Africa. Flowers yellow, racemose, rising from below the leaves, from the wood of the preceding year; sepals five, coloured; petals five to ten; pedicels articulated. Fruit succulent, of five, ten, or fewer carpels, placed on the enlarged receptacle. Leaves alternate, deciduous, serrulate, rarely entire, coriaceous, shining, thickly nerved. Several species are very ornamental, but the undermentioned are probably the only ones in cultivation. They thrive best in a compost of sandy peat and fibry loam; plenty of drainage is very essential. Propagated, during summer, by cuttings of half-ripened shoots.

O. atropurpurea (dark purple). *fl.*, petals yellow; calyx dark purple, with ovate lobes; pedicels solitary, one-flowered. *l.* ovate, acutely denticulate. *h.* 4ft. Cape of Good Hope, 1816. (B. M. 4519.)

O. multiflora (many-flowered). *fl.* yellow, of very short duration. Spring. *fr.*, receptacle gradually increasing in size, becoming globular in form, about the size of a Strawberry, but less conical, and similar in colour; upon it are placed the black, seed-like bodies, about the size of Peas, which are really the carpels, and these present a striking contrast with the bright crimson receptacle and calyx. *l.* narrow, elliptical, bright green, serrated. *h.* 4ft. to 5ft. Sierra Leone, 1820 and 1882. A remarkable and handsome plant.

OCHNACEÆ. An order of trees or shrubs with watery juice, sparsely scattered over the whole of the tropical regions (mostly in America). Flowers hermaphrodite, often large and showy, usually paniculate, rarely axillary and solitary, or fasciculate; sepals four or five, free, imbricated; petals five, rarely four or ten, free, longer than the calyx, deciduous, spreading, subsessile, imbricated or convolute. Fruit a drupe or berry. Leaves alternate, stipulate, highly glabrous, simple (in one genus pinnate), coriaceous, frequently with serrated margins, often thickly nerved; stipules varying. Some of the species possess tonic properties. The berries of *Gomphia Jabotapita* are edible. The order contains a dozen genera and about 140 species. The principal genus is *Gomphia.*

OCHRACEOUS, or **OCHREOUS.** Having the colour of yellow ochre.

OCHRANTHE. A synonym of **Turpinia** (which *see*).

OCHREA. A term applied to a membranous tubular stipule, formed by the consolidation of two opposite stipules, and through which the stem passes.

OCHROCARPUS (from *ochros*, yellow, and *karpos*, a fruit; alluding to the colour of the fruits). SYN. *Calysaccion.* ORD. *Guttiferæ.* A genus comprising about half-a-dozen species of stove trees, natives of Asia, tropical Africa, and the Mascarene Islands. Flowers polygamous, disposed in lateral or axillary short cymes or fascicles; petals four. Leaves opposite or ternately whorled, coriaceous. The species described below is probably the only one yet introduced; it thrives freely in a sandy loam compost. Propagation may be effected by cuttings of the ripened wood, inserted, with the leaves intact, in sand, under a glass, in moist heat.

O. africanus (African). *fr.* with a brown and thick rind, and a yellow pulp, twice the size of a man's fist, round. *l.* oblong, acuminated, shining dark green, abounding in a yellow, resinous gum. *h.* 60ft. Tropical Africa. SYN. *Mammea africana.*

OCHROLEUCUS. Whitish-yellow.

OCHROMA (from *ochros*, pale; referring to the colour of the flowers). ORD. *Malvaceæ.* A monotypic genus. The species is a stove evergreen tree. It thrives in a rich sandy loam. Propagated by cuttings of half-ripened side-shoots, inserted in sand, under a bell glass, in heat.

O. Lagopus (hare's foot). *fl.* pale brown or yellowish, large, erect; peduncles solitary, terminal, one-flowered. Capsule more than 1ft. long. *l.* cordate, five to seven-angled, rather lobed, toothleted, downy beneath. *h.* 40ft. West Indies, &c., 1802.

OCHROPTERIS (from *ochros*, pale, and *pteris*, a Fern; in reference to the colour of the plant). ORD. *Filices.* A monotypic genus. The species is an extremely rare and beautiful stove Fern, requiring an abundance of heat and moisture to grow it successfully. It thrives best in a compost of peat and sand, with a little loam added. For general culture, *see* **Ferns.**

O. pallens (pale). *sti.* 2ft. long, naked. *fronds* about the same length, about 1ft. broad, deltoid, quadripinnatifid; lower pinnules 3in. to 4in. long, 2in. broad, their segments cut down to the rachis below, with oblong, toothed, lower lobes. *sori* marginal, transversely oblong, occupying the apices of the lobes of the segments; involucre the same shape as the sorus, formed of the reflexed margin of the frond, with which it coincides in texture, and covering the sorus. Mauritius. (H. S. F. 77B.)

OCHROSIA (from *ochros*, pale yellow; alluding to the colour of the flowers). SYNS. *Bleekeria, Lactaria.* ORD. *Apocynaceæ.* A genus comprising about a dozen species of stove trees, allied to *Cerbera*, natives of the Mascarene Islands, tropical Australia, the Malayan Archipelago, and the Pacific Islands. Calyx five-parted; corolla funnel-shaped, five-lobed; cymes pedunculate, at the tips of the branches. Leaves whorled or rarely opposite or scattered, slender, and thickly penniveined. The two species here given are probably the only ones yet introduced. For culture, *see* **Tabernæmontana.**

O. borbonica (Bourbon). *fl.* white, rather large; calyx lobes ovate. June. *l.* three (rarely four) in a whorl, oblong or oblong-lanceolate, obtuse or sub-acute, 3in. to 6in. long, glossy, ⅝in. to 1¼in. broad, often spotted; margins not revolute. *h.* 20ft. to 40ft. Mauritius, &c., 1782. SYN. *O. maculata.* (A. B. R. 130, under name of *Cerbera undulata.*)

O. elliptica (elliptic-leaved). *fl.* yellow, in small, dense, corymbose cymes, shortly pedunculate in the uppermost axils, *l.* elliptic, coriaceous, deep green, usually three in a whorl. Queensland, &c.

O. maculata (spotted). A synonym of *O. borbonica.*

OCIMUM (from *Okimon*, the old Greek name used by Theophrastus). Basil. Including *Becium.* SYN. *Ocymum.* ORD. *Labiatæ.* A genus of half-hardy herbs, sub-shrubs, or small shrubs, broadly dispersed over the

Ocimum—*continued.*

warm regions of the globe. Flowers often white, small, or mediocre; whorls six to ten-flowered, disposed in terminal, simple, or paniculate racemes; bracts rarely exceeding the flowers. Few of the species have any horticultural value, though *O. Basilicum* is largely grown in pots, on the Continent, for room decoration. For culture, &c., of the annual species, *see* **Basil, Sweet.** The shrubby kinds may be increased by cuttings of the young shoots, inserted in sandy soil, in a frame, and kept shaded until rooted. All like well-drained, rather dry, sandy loam.

FIG. 712. PORTION OF PLANT AND PIECE OF DETACHED INFLORESCENCE OF OCIMUM BASILICUM.

O. Basilicum. Common or Sweet Basil. *fl.* white; racemes simple. August. *l.* petiolate, ovate or oblong, narrowed at the base, a little toothed. *h.* 1ft. Warm regions of Asia and Africa, 1548. Erect or ascending annual. See Fig. 712.

O. canum (hoary). *fl.* white, in simple racemes; calyces longer than the pedicels. July. *l.* petiolate, ovate, narrowed at both ends, almost entire, canescent beneath. *h.* 1ft. Madagascar, &c., 1822. Plant erect, herbaceous, pubescent. (B. M. 2452.)

O. febrifugum (febrifuge). A synonym of *O. viride.*

O. filamentosum (thready). *fl.* white, rather large, in simple racemes; corolla four times as long as the calyx. July to October. *l.* shortly petiolate, ovate-oblong, narrowed at both ends, acutely serrated, finely pubescent. Stem shrubby, branched, tomentose. *h.* 2ft. to 3ft. East Africa, 1802. (B. R. 1843, 15, under name of *Becium bicolor.*)

O. micranthum (small-flowered). *fl.* small, arranged in whorls of three, in terminal leafless racemes; corolla nearly white. May. *l.* rather long-stalked; young ones oblong, acuminated; older ones 3in. or more long, broadly ovate, acute, serrated. *h.* 8in. to 10in. West Indies, 1825. Annual. (B. M. 2996, under name of *O. montanum.*)

O. minimum (least). Bush Basil. *fl.* white, in short, simple racemes; whorls loose. Summer. *l.* on long petioles, ovate, almost or quite entire. Stem erect, finely pubescent. *h.* 6in. to 12in. Chili, 1573. Annual.

O. montanum (mountain). A synonym of *O. micranthum.*

O. scutellarioides (Scutellaria-like). A synonym of *Coleus scutellarioides.*

O. viride (green). *fl.* greenish-white, in branched racemes; corolla hardly exceeding the calyx. July to October. *l.* petiolate, ovate-oblong, acuminated, crenated, narrowed at base, glabrous or downy on the ribs; floral ones bract-formed. Stem shrubby, branched. *h.* 2ft. to 4ft. West Africa, 1816. The leaves of this species are used in the manner of tea, as a febrifuge, at Sierra Leone, under the name of Fever Plant. (B. R. 753, under name of *O. febrifugum.*)

OCOTEA (said to be the native name of the tree in Guiana). SYN. *Oreodaphne.* ORD. *Laurineæ.* A large genus (about 200 species) of stove or greenhouse trees, or rarely shrubs, for the most part natives of tropical and sub-tropical America, a few being found in the Canary Islands, South Africa, and the Mascarene Islands. Flowers small, glabrous, or rarely slightly tomentose, disposed in axillary or almost terminal pedunculate panicles; perianth tube short or campanulate; limb segments six. Leaves

Ocotea—*continued.*

alternate or scattered, rarely almost opposite, coriaceous, penniveined. The undermentioned is probably the only species yet introduced. It thrives in well-drained loam, and is propagated by cuttings of the young ripened wood, inserted, during summer, in a sandy soil, under a bell glass.

O. bullata (blistered). *fl.* green, remarkably small, racemose. *l.* olive or brownish-green, alternate, coriaceous, elliptical, entire, acute, rather obtuse at base, and having at the axils of two or more of the lower costal veins on the under side, deep pits or hollows, exhibiting on the upper side corresponding elevations (whence the specific name). Cape of Good Hope. Greenhouse tree. (B. M. 3931, under name of *Oreodaphne bullata.*)

O. californica. *See* **Umbellularia californica.**

OCTADESMIA (from *okto*, eight, and *desme*, a bundle; in reference to the eight pollen masses). ORD. *Orchideæ.* A genus comprising only three species of stove, epiphytal Orchids, natives of Jamaica and San Domingo. Flowers mediocre, shortly pedicellate; sepals almost of equal length, somewhat spreading; petals a little broader than the sepals; lip at base of column nearly erect; peduncle terminal, simple or slightly branched. Leaves linear-lanceolate, distichous, somewhat rigid, not fleshy. *O. montana*, the only species in cultivation, is a singular little Orchid, more curious than beautiful. It succeeds in an intermediate house, planted in a small teak basket, using a compost of peat fibre, sphagnum, and bits of charcoal. Water must be liberally supplied during summer, and, to a considerable extent, withheld during winter.

O. montana (mountain). *fl.* white, suffused with a fulvous colour; sepals and petals lanceolate; lip oblong-linear, crenulate; raceme terminal, few-flowered. October. *l.* distichous, serrulate at apex, linear-lanceolate, sheathed at base. *h.* 6in. Rio Janeiro, 1826. (B. M. 2823, under name of *Octomeria serratifolia.*)

OCTANDROUS. Having eight stamens.

OCTOGYNOUS. Having eight styles.

OCTOMERIA (from *okto*, eight, and *meris*, a part; in allusion to the pollen masses). SYN. *Aspegrenia.* ORD. *Orchideæ.* A genus of greenhouse, epiphytal Orchids. Nearly a score species have been described, although, probably, not more than three have been introduced; they are natives of Brazil, Guiana, and the West Indies. Flowers whitish or yellowish, inconspicuous, in dense, sessile clusters; anther-bed rotundate, rostellum short; pollinia eight. Leaves oblong, linear, or sub-terete. Stem developed. These curious little Pleurothallis-like epiphytes are frequently imported along with Bromeliads, about the bases of which they grow on the trunks of large trees. For their cultivation they require greenhouse treatment. They thrive in pots of peat and sphagnum, and require abundance of water at all times.

O. graminifolia (Grass-leaved). *fl.* pale yellow, with two red spots; perigonal divisions ovate-lanceolate, interior little shorter; lip cuneate-oblong, blunt, or minutely denticulate at the summit, obliquely two-crested, and with two short lateral lobes at the middle. May. *l.* lanceolate-linear. *h.* 6in. West Indies, 1793. (B. M. 2764.)

O. Saundersiana (Saunders'). *fl.* pale yellow, with three purple stripes on the sepals and petals; lip ochre-coloured; disk and calli mauve, streaked in front, and numerously dotted. Winter. *l.* thick, terete, subulate. Brazil, 1880.

O. serratifolia (serrate-leaved). A synonym of *Octadesmia montana.*

O. tricolor (three-coloured). *fl.* white, small. *l.* cuneate-oblong, tessellated with purple beneath. Brazil, 1872.

OCTOMERIA (of Don). A synonym of **Eria** (which *see*).

OCYMUM. A synonym of **Ocimum** (which *see*).

ODES, OIDES. A Greek termination, signifying similarity; *e.g.*, Phyllodes, leaf-like.

ODONTADENIA (from *odous*, *odontos*, a tooth, and *aden*, a gland; in allusion to the five-toothed glands). SYNS. *Anisolobus, Cylicadenia.* ORD. *Apocynaceæ.* A genus comprising about eighteen species of stove, scandent

Odontadenia—*continued.*

shrubs, natives of tropical America, mostly Brazil and Guiana. Flowers yellow, showy, disposed in loose, often large, rarely few-flowered and scarcely branched cymes; calyx five-parted; corolla funnel-shaped or sub-hypocrateriform. Leaves opposite, penniveined. *O. speciosa*, probably the only species in cultivation, perhaps does best when planted out in a prepared border in the stove, and the long shoots trained along the rafters. If cultivated in pots, a fairly liberal amount of root-room must be accorded; and thorough drainage is always essential. Good turfy loam, pieces of charcoal, a handful of coarsely-crushed bones and sharp sand, make a compost in which the species succeed well. Insects must be kept in check by fumigation, or the use of one or other of the insecticides mentioned in this work. Odontadenias are propagated by cuttings of the young shoots, which strike readily in bottom heat.

O. speciosa (showy). *fl.* bright yellow, shaded with orange, large, of good form, and delicately scented. *l.* large, oblong-ovate, acute, quite smooth, dark green. Trinidad, 1854. SYN. *Dipladenia Harrisi.* (B. M. 4825.)

ODONTARRHENA. Included under *Alyssum.*

ODONTOGLOSSUM (from *odous, odontos*, a tooth, and *glossa*, a tongue; referring to the tooth-like processes on the lip). Including *Mesospinidium* (some of the plants grown in gardens under the generic name of *Mesospinidium*, belong to the genus *Cochlioda*). ORD. *Orchideæ*. This genus comprises, according to some authorities, over one hundred species of handsome, stove Orchids, inhabiting the Andes of tropical America, from Bolivia as far as Mexico. Flowers with spreading, free sepals; petals nearly equal; lip with its base parallel with the column, and its limb deflexed and generally crested in various ways; column usually long, narrow at the base, and eared, or winged, at the summit; pollen masses two, with a narrow caudicle attached to an oval gland. Leaves in nearly all the species ensiform, usually sub-coriaceous in texture, linear-lanceolate or simply lanceolate, complicate at base, tapering to a more or less acute point. This genus is distinguished from *Oncidium* by the column being long and narrow, or, at any rate, not swollen, at the base, and by the base of the lip being always parallel with the face of the column.

For purposes of cultivation, the Odontoglossums may be divided into two groups, comprising (1) all those species which require the treatment of an intermediate house, *i.e.*, a temperature not lower than 50deg. to 55deg. in winter, and correspondingly high in summer; and (2) those which will thrive in a cool house, from which frost only is excluded, or, for safety, say, where the temperature will not fall below 40deg. Many of these plants, as well as other orchids, are found at very high elevations, where, at some seasons, they are visited by slight frosts and snow. Recently, many species of *Odontoglossum* have been successfully cultivated out of doors under the shade of trees, and where the atmosphere about them could not become too parched. The plants are hung up, either in baskets or on rafts, exactly as when cultivated under glass, and are syringed frequently in dry weather; they are not injured, but, on the contrary, much benefited, by frequent showers of rain. It is probable that, as these and other Orchids become cheaper, they will be cultivated at much less cost than at present, and no doubt outdoor cultivation, for at least a portion of the year, will be adopted for a great number of those from cool and temperate climes. Even those from warmer regions would most probably be improved by open-air cultivation during our hot season. For the species requiring warm-house treatment, and which are distinguished in the subjoined list by a dagger (†), the following points must be attended to. When making their growth, which is during the summer, they require plenty of water, a position near

Odontoglossum—*continued.*

the glass, where they would be shaded only from bright sunshine, and a moist atmosphere, with plenty of fresh air about them, care being taken that the temperature does not fall too low through the latter. During the winter, they should be kept almost dry, and, in spring, quite dry till the flower spikes appear, when water should be applied liberally, and continued till the summer's growth is again completed.

The species grown in a cool house do not, as a rule, require a resting season similar to the above, but should be kept uniformly moist at the roots all the year round; indeed, many of them grow freely all through the winter. None of them like direct sunshine in summer, but in winter they enjoy all the sunlight possible. It is, therefore, a good plan to place the plants in a house with a northerly aspect for the summer, whilst, on the return of the cold, dull weather of winter, they may, with advantage, be removed into a house with an aspect due south. In the United States, the Odontoglossums invariably make two growths a year, the one in summer, and the other in winter, the latter being favoured by the clear and bright light which prevails in North America in winter. It should be remembered that, whilst very few orchids—certainly no Odontoglossums—enjoy excessive sunlight, they are, nevertheless, much healthier and more floriferous when grown in a house where they can obtain all the light possible, short of the fierce sunlight of our summers. Generally, Odontoglossums require a moist atmosphere at all times, and, after a bright day, are much invigorated by a gentle dewing overhead by means of a syringe. A few of the species, such as *O. Cervantesii, O. Londesboroughianum, O. Rossii Dawsonianum*, &c., may be satisfactorily grown when fastened on to a block, formed of fern stem; but Odontoglossums succeed best when grown in baskets or in pots, using a mixture of peat (broken into lumps the size of walnuts) and sphagnum, with a few lumps of charcoal and a little sand scattered through it. Pots should be half-filled with drainage, and baskets covered at the bottom with a large crock, or a few pieces of charcoal. Round the top of the soil a little fresh sphagnum should be placed; it will soon grow, and cover the whole surface with a fresh green, and prevent excessive evaporation in hot weather. To establish newly-imported Odontoglossums, they should be first carefully examined, and all dead bulbs, scales, and roots cut away; they may then be rinsed in warm water, and allowed to dry, before placing them in a little soil. The pots used should be as small as possible, all that is necessary being room for the base of the plant to stand in each with a little peat and sphagnum about it. Very little soil must be used, the pot being filled almost full of crocks; unless this precaution is taken, there is danger of the weakened plants being injured, and perhaps killed, by the water which would be held about them by a large body of soil. They should be placed in a shaded part of the house where they are to be grown when established. It is not wise to attempt to force the plants into growth by subjecting them to a high temperature, as the effect of this, although promising at first, is to weaken the whole plant by causing it to start into growth before it has recovered from the injuries caused by importation. All the Odontoglossums are propagated by division, none having, as yet, been raised from seeds in this country. Mr. H. Veitch, in his paper on the "Hybridisation of Orchids," read at the Orchid Conference, on May 13th, 1885, says that numerous crosses between various species, both Mexican and New Grenadan, have been effected, and capsules, with apparently good seed, have been produced; but, with the utmost care that could be bestowed, no progeny has yet been raised.

The plants which are, perhaps, best known under the names of *O. Phalænopsis, O. Roëzlii, O. vexillarium*, &c.,

Odontoglossum—*continued.*

but which, in this work, are referred to the genus *Miltonia*, will not hybridise—or, at any rate, no one, up to the present time, has succeeded in making them do so—with any of the true Odontoglots. Certainly, it appears to favour the view here taken of the generic affinities of the plants in question, when, on the authority of Messrs. Veitch and Sons, we are enabled to state that, with other Miltonias, they cross and intercross readily.

Odontoglossum—*continued.*

Through some mistake or other, Mr. Bentham, in the "Genera Plantarum," asserts the contrary.

A considerable number of Odontoglots, which are generally accorded specific rank, are here reduced to varieties. In this we have been guided, to a great extent, by Messrs. Veitch and Sons, who have made a special study of the genus, and carefully compared, as they flowered, the numerous specimens of each so-called

FIG. 723. ODONTOGLOSSUM CIRRHOSUM.

Odontoglossum—*continued.*

species in their magnificent collection. We are indebted to the firm in question for permission to peruse the manuscript of their yet unpublished monograph.

O. acuminatum (taper-pointed). A synonym of *O. Rossii.*

O. Alexandræ (Alexandra's). A synonym of *O. crispum.*

O. A. Bowmani (Bowman's). A synonym of *O. crispum guttatum.*

O. anceps (two-edged). A synonym of *O. maculatum.*

O. Andersonianum (Anderson's). A variety of *O. crispum.*

O. anthoxanthum (yellow-flowered). *fl.* sulphur-coloured, small, growing in a flexuous raceme; lip sub-cordate at the base, three-lobed. Peru, 1869.

O. aspersum (sprinkled). A variety of *O. Rossii.*

O. bictonense (Bicton).*† *fl.* about 1in. across, varying much in colour, most frequently yellowish-green, transversely barred with brownish-purple, whilst the lip is lilac, shaded with violet, or sometimes nearly white; spikes about 2ft. high, bearing from twenty to thirty flowers. April. Pseudo-bulbs and leaves bright green. Guatemala, 1835. This plant was formerly a great favourite, and, moreover, was the first Odontoglot which reached England in a living state; but, since the introduction of so many fine kinds, it has gone somewhat out of fashion. It is, however, remarkably free in its flowering and habit of growth. (B. M. 3812, under name of *Zygopetalum africanum*; B. O. 18; B. R. 1840, 66.) This species has many varieties, of which the two following are by far the best: *album*, in which the lip is pure white; and *superbum*, having sepals and petals heavily blotched with rich crimson-brown, and a deep coloured rosy-purple lip.

O. blandum (fair).* *fl.* yellowish-white, beautifully spotted and freckled with maroon-crimson; sepals and petals narrow and acuminated; lip with an ovate-acuminate, crisped blade. Columbia, 1870. A handsome plant, somewhat resembling *O. nævium*, but with the blade of the lip much more expanded. (B. O. 28.)

O. Bluntii (Blunt's). A synonym of *O. crispum.*

O. brevifolium (short-leaved), of gardens. A synonym of *O. coronarium.*

O. cariniferum (keel-bearing).† *fl.*, sepals and petals oblong-lanceolate, greenish outside, and furnished on the middle line with keels; inside they are chestnut-brown, bordered with greenish-yellow or yellow; lip with the claw of violet colour, the cordate-acute anterior part being white; panicle large, branched. *l.* cuneate-oblong, ligulate. Pseudo-bulb oblong, two-leaved. Central America, 1855. SYN. *O. hastilabium fuscatum.* (B. M. 4919; B. O. 10.)

FIG. 714. FLOWER OF ODONTOGLOSSUM CERVANTESII.

O. Cervantesii (Cervantes').*† *fl.* from 1in. to 2in. across; sepals and petals rosy-lilac, barred at the base with crimson-brown; lip cordate or triangular, white or lilac; spikes 6in. high, three to five-flowered. March and April. *l.* lanceolate, solitary. Pseudo-bulbs angular. Oaxaca, 1845. A pretty, dwarf-growing species. SYN. *O. membranaceum.* See Fig. 714. (B. R. 1845, 36; L. & P. F. G. i. 15.)

O. C. decorum (becoming). A fine variety, with larger flowers and more brightly-coloured markings than the type. (F. M. n. s. 254.)

O. C. majus (larger). A good variety, with larger and more brightly-spotted flowers than the type. Mexico, 1879.

O. C. punctatissimum (much-spotted). A handsome variety, having flowers covered with neat, purplish spots. 1878. (B. O. 10.)

O. cirrhosum (tendrilled).*† *fl.* milk-white, with deep purplish-violet dark spots on sepals, petals, and the anterior, inferior part of lip, the basilar part of which is whitish-yellow at both sides, and with purplish-violet radiating lines; sepals lanceolate, ending in bristles; petals much broader; lip cuneate, dilatates going out in two blunt, wavy angles, the upper part bearing an open sheath around the column, the anterior expanded; peduncles racemose or panicled, many-flowered, *l.* linear-ligulate. Pseudo-bulbs ligulate, ancipitate. Ecuador, 1876. See Fig 713, for which we are indebted to Messrs. Veitch and Sons. (B. M. 6317; G. C. n. s., v. 503.)

O. c. gemmatum (jewelled). A good variety, with groups of mauve or purple stains at the base of the sepals and petals.

O. c. Hrubyanum (Hruby's). A variety having flowers without spots, or with but few traces of them.

O. c. Klabochianum (Klaboch's). A variety with much larger flowers than the type.

O. citrosmum (Lemon-scented).*† *fl.*, sepals and petals pure white, delicately lemon-scented; lip purple, crescent-shaped; racemes pendulous, bearing from fifteen to thirty flowers. May. *l.* thick. Pseudo-bulbs smooth, shining light green. Guatemala, 1840. SYN. *O. pendulum* (B. O. 6). (B. R. xxix. 3; F. d. S. 633.)

O. c. album (white). *fl.* white, except the crest on the claw of the lip.

O. c. punctatum (dotted). *fl.* pale rose; sepals and petals dotted with purple.

O. c. roseum (rose). *fl.* having the blade of the lip deep rose.

O. constrictum (contracted). *fl.*, sepals and petals bright yellow, with orange-brown blotches and bars; lip pandurate, white, tipped with yellow, and bearing two conspicuous rose-coloured spots near the centre; panicles large, branched, many-flowered. *l.* elongate, linear-lanceolate. Pseudo-bulbs ovoid, compressed, ribbed, dark green. Caraccas, 1843. A pretty, free-flowering plant. (B. M. 5736.)

O. c. Sanderianum (Sander's).* *fl.*, sepals and petals light ochre, with brown marks and stripes, lanceolate, acuminate; lip cordate at base, with two short, upright lobes; blade large, sub-pandurate, acute, wavy, white, tinted with sulphur, and having a large purple-crimson mark between the calli, and some spots in front. Columbia (?), 1881. A handsome, Hawthorn-scented variety, superior to the type.

O. Coradinei (Coradine's). A variety of *O. Lindleyanum.*

O. cordatum (heart-shape-lipped). *fl.*, sepals and petals yellow, blotched and barred with deep rich chocolate-brown, very much elongated, and curiously wavy; lip large, heart-shaped, varying somewhat in its markings, ground colour white, blotched with lilac and purplish-red, or sometimes with pale yellow and crimson; scape 1ft. or more in height, stiff, erect, simple or branched, few or many-flowered. Late spring. *l.* bright green, with yellow lines. Pseudo-bulbs oblong, generally one-leaved. Guatemala and Mexico, 1837. A free-flowering and easily-grown species, though less striking than many of its congeners. (B. M. 4878, under name of *O. maculatum*; B. O. 25; R. G. 356.)

O. c. sulphureum (sulphur-coloured). *fl.*, sepals sulphur-coloured; petals and lip white, with sulphur tips and blotches. Mexico, 1880. A highly curious variety.

O. coronarium (crowned).* *fl.*, sepals and petals reddish-brown, edged with yellow; lip bright golden-yellow; spike erect, 1ft. or more in height, bearing from thirty to forty blossoms. Pseudo-bulbs large, wrinkled, flat, produced at intervals along a creeping rhizome, bearing a short, oblong leaf at the apex. Peru, 1868. (B. O. 27; G. C. n. s., xii. 301; W. O. A. i. 27, under name of *O. brevifolium.*)

O. c. Dayanum (Day's). *fl.*, petals yellow, with brown marbling; lip with two conical acute warts on each side of the crest.

O. crinitum (hairy). *fl.* striped and blotched, racemose; sepals and petals lanceolate, acuminate; lip covered with filiform processes. Columbia, 1882. A very distinct species. (R. X. O. 191, 3.)

O. crispum (curled).* *fl.*, sepals and petals pure white, ovate or ovate-lanceolate, the petals being much undulated, and often fimbriately toothed; lip oblong-acuminate, yellow, crested towards the base, beautifully crisped at the margin, and more or less spotted towards the front with blotches of reddish-brown; racemes pendulous, usually from six to twelve-flowered. New Grenada. This is one of the gems of the cool orchid-house, since, by a little management, its charming flowers may be had all the year round. It is a plant which varies to an almost endless extent, no two, of the many thousands imported, being, perhaps, exactly alike, and very considerable difference in size, colouring, or crispness in the flowers constantly presenting itself. See Fig. 715, for which we are indebted to Mr. Wm. Bull. SYNS. *O. Alexandræ* and *O. Bluntii* (F. d. S. 1652). (B. O. 19.)

O. c. Andersonianum (Anderson's).* *fl.* milky yellowish-white, with some very broad, cinnamon, longitudinal stripes: sepals and petals ovate-oblong, acute, crisped; lip pandurate, with wavy and toothed margins. Pseudo-bulbs ligulate, pyriform. Columbia, 1868. A very handsome and rare plant. SYN. *O. Josephinæ* (W. O. A. iv. 188). (F. M. n. s. 45; W. O. A. i. 35.)

Odontoglossum—*continued.*

O. c. A. guttulatum (small-spotted). *fl.* beautifully marked with small brown spots on the sepals and petals; lip white, with a yellow base and a few brown lines. A pretty sub-variety.

O. c. Chestertonii (Chesterton's). *fl.*, sepals and petals broad, the sepals white, with small reddish-brown transverse blotches; petals white, with two to five red-brown spots; lip red-brown, with a broad, yellowish-white margin.

O. c. fastuosum (proud). *fl.*, odd sepal deep bluish-lilac, with a white border and two large brown-violaceous blotches; lateral sepals white on the inner half, lilac-violet on the outer, blotched brownish-violet towards the base; petals white, with a brownish-violet line at base; lip obovate, very flat; keels yellow. A distinct variety. 1878.

O. c. flaveolum (yellowish). A distinct variety, with yellow flowers, and a very few red spots and lines. Bogota, 1880. (W. O. A. i. 43.)

O. c. giganteum (gigantic). *fl.* white, spotted all over very profusely with reddish-brown, large; spike 3ft. high, branching, and many-flowered. A very fine, but rare, variety.

O. c. guttatum (spotted).* A well-marked variety. To the general features of the typical species, it adds larger flowers, of a pure white ground colour, with a few well-marked spots of a coppery red on each sepal and petal, and the singularly oblong-

FIG. 715. ODONTOGLOSSUM CRISPUM.

Odontoglossum—*continued.*

quadrate appendiculate lip suffused with yellow towards the base, where it is margined with brown spots, terminating in one larger central one, and forming a ring around the disk. New Grenada, 1867. SYN. *O. Alexandræ Bowmani* (B. M. 5697, under name of *O. Alexandræ guttatum*; W. O. A. ii. 94.)

O. c. Jenningsianum (Jennings').* *fl.* cream-white, with many light cinnamon blotches, which are very numerous in the petals; base of lip yellow, with a few cinnamon lines. 1878. A pretty plant, the flowers of which are said to be exceedingly like those of *O. c. Ruckerianum*, but distinct by their very crisp, wavy nature, and by the basilar callus of the lip. (G. C. n. s., ii. 366.)

O. c. Lehmanni (Lehmann's). *fl.* usually purple, with a brown tint, numerous; inflorescence branched. *l.* rather narrow. South America, 1880. A curious plant.

O. c. limbatum (bordered). *fl.* milk-white; sepals richly marked with lilac; lip with numerous violet spots at the tip, and with yellow lamellæ and a few streaks at the base; panicle many-flowered. Columbia, 1870. An interesting orchid. (R. X. O. 183, 2.)

O. c. Mariæ (Miss Marie André's). A beautiful variety, with pure white flowers, except two red spots at base of lower sepals, a few red streaks on the column, and the callus tinted with yellow. Columbia, 1879. (I. H. n. s. 325.)

O. c. Ruckerianum (Rucker's).* *fl.*, ground colour creamy-white; sepals and petals bordered with deep violet, with a few chestnut-brown blotches on their inner surfaces; narrow lip, yellow at the base, with blotches of chestnut-brown. (G. C. 1873, 105.)

O. c. Stevensii (Stevens'). *fl.* white, heavily barred with light brown, large; lip with a clear yellow disk. A grand form. (W. O. A. iii. 127.)

O. c. Trianæ (Triana's).* *fl.* white, flushed, especially on the upper half of the dorsal sepals, with rose, the rosy portion being spotted with carmine, the dorsal sepal bearing a single large rosy spot; 2½in. across, crowded in a dense spike; the lip is large, rounded, and two-lobed at the apex, white, freely spotted with coppery red. Columbia, 1868. A very beautiful variety. (B. M. 5691.)

O. c. Veitchianum (Veitch's).* *fl.*, sepals and petals white, with a zone of mauve and some brown blotches, broad. 1884. A fine form.

O. c. Warneri (Warner's).* *fl.*, sepals white, stained with rose, and spotted with purplish-brown; petals very broad, toothed at the edges, pure white; lip large, white, stained at the base with rich yellow. Columbia, 1869. A splendid form.

O. c. xanthoglossum (yellow-lipped). A variety with a yellow lip, having a few lines and a large lobed blotch of brown. 1883.

Other varieties of *crispum* are: *aureum*, *Ballantinei*, *Cooksoni* (W. O. A. iii. 118), *elegantissimum*, *Reginæ*, *roseum* (F. M. n. s. 269), *Rothschildianum*, *Sanderianum*, *sulphureum*, and *virginale*.

O. cristatum (crested).* *fl.*, sepals and petals creamy-yellow, varying in intensity in the different forms, banded or spotted with very dark brown or purple, and about 2in. in diameter; lip whitish, spotted with dingy brownish-purple, with a radiating white crest. Pseudo-bulbs somewhat oval, of a light shining green, bearing very narrow leaves of the same hue. Peru. A very desirable species, although not so showy as many others. (I. H. 1870, 21).

O. c. Argus (Argus). *fl.* bright yellow, with purplish speckles and freckles; lip and column white, with purplish markings. (I. H. ser. ii. 21.)

O. c. canaria (canary-coloured). *fl.*, sepals and petals bright clear yellow, each with a single purplish blotch.

O. c. cristatellum (slightly-crested). *fl.* light yellow, with a few sepia-brown spots; lip short, narrow, nearly oblong-pandurate, apiculate, undulate, anterior part sepia-brown; the front side of column has three violet spots on its base, and some brown lines. Winter. 1878. (W. O. A. 66.)

O. c. Dayanum (Day's). A variety with a rhomboid, apiculate, serrate lip, the crests on its base crossing one another.

O. crocidipterum (saffron-winged). *fl.* deliciously scented like Hawthorn; sepals and petals pale yellow, spotted with brown, from 2in. to 3in. across; lip having a bilobed, white crest, around which is a blotch of clear lemon-yellow; spikes from 1ft. to 1½ft. long, many-flowered. August and September. Pseudo-bulbs compressed and conical, two-leaved. Columbia, 1870. (R. X. O. ii. 192.)

Odontoglossum—*continued.*

O. Dormanianum (Dorman's).* *fl.* whitish, with numerous dark spots, and resembling those of *O. crocidipterum*; base of the lip yellow, sometimes with a few red stripes; tip of the lip with a large blotch. *l.* very narrow, and short. Pseudo-bulbs elliptical, blunt, two-edged, grooved and wrinkled. 1884.

O. Edwardi (Edward Klaboch's).† *fl.* mauve-coloured, with a light purple hue; lip with an ochre-coloured callus; inflorescence many-flowered. Ecuador, 1878. (B. M. 6771.)

O. elegans (elegant).* *fl.*, sepals and petals faint yellowish, with narrow, brown blotches; lip yellowish, with the apical part white, having two long, serrate calli, and two small, acuminate, extrorse, adventitious ones marked with reddish spots. Ecuador, 1879. A natural hybrid, much resembling *O. cirrhosum*. (Gn. xxiv. 459; W. O. A. iii. 3.)

O. Galeottianum (Galeotti's). *fl.* white; petals transversely barred with brown at the base; lip with a few streaks of yellow near the base; raceme few-flowered. Mexico, 1870. Allied to *O. nebulosum*, and very rare in cultivation.

O. gloriosum (glorious). A synonym of *O. odoratum*.

O. grande (magnificent).* *fl.* from 4in. to 7in. in diameter; sepals and petals rich glossy orange-yellow, the basal half being transversely banded and blotched with bright chestnut-brown; lip creamy-white, more or less freckled with brown; scapes stout, erect, from four to nine-flowered. Autumn and winter. *l.* lanceolate, broad, 6in. to 9in. long, dark green. Pseudo-bulbs glaucous, thick, slightly angular, two-leaved. Guatemala, 1839. This is one of the most beautiful, the largest the best known, and the easiest grown of Orchids. (B. M. 3955; B. O. 8; R. G. 1859, 270; W. O. A. ii. 79.)

O. g. splendens (splendid). A rare and beautiful variety, differing from the type in having brown markings and a nearly white lip, with pure purplish bars. 1872.

O. g. Williamsianum (Williams'). This resembles the type, but has shorter, broader, and more obtuse petals; column with uncinate wings. 1881. (W. O. A. 163.)

FIG. 716. FLOWER OF ODONTOGLOSSUM HALLII.

O. Hallii (Hall's).* *fl.* about 4in. across; sepals and petals pale yellow, with large chocolate-brown patches, and terminating in long points; lip pure white, with a beautifully-fringed margin, spotted and blotched with brown and purple, and stained towards the base with deep yellow; spike many-flowered. *l.* light green, 1ft. or more long, 2in. broad. Pseudo-bulbs about 3in. high. Ecuador, 1865. See Fig. 716. (B. M. 6237; B. O. 21; F. M. 1868, 378; I. H. ser. iii. 58.) The variety *xanthoglossum* is distinguished principally by having a yellow lip. Columbia, 1879.

Odontoglossum—*continued.*

O. hastilabium (halbert-lipped).* *fl.* large, 1½in. across, very fragrant, and numerous; sepals and petals soft creamy-white, beautifully streaked with transverse lines of whitish-brown; lip somewhat spear-shaped, white, with a dark rose base; spike 2ft., 3ft., or more high, much branched, and many-flowered. Summer. Pseudo-bulbs thick, pale green, fluted, with rather dark broad leaves. New Grenada, 1843. A strong-growing, handsome species. (B. M. 4272; B. O. 7.)

O. h. fuscatum (brownish). A synonym of *O. cariniferum.*

O. histrionicum (histrionic). A synonym of *O. luteo-purpureum mulus.*

O. Holfordianum (Holford's). A synonym of *O. luteo-purpureum mulus.*

O. Horsmani (Horsman's). *fl.* light sulphur-colour, with a few cinnamon blotches on the sepals; lip broad, wedge-shaped at base, with obscure teeth at the rounded outer border. New Grenada, 1880.

O. hystrix (bristly). A synonym of *O. luteo-purpureum.*

O. Insleayi (Insleay's).*† *fl.* from 2in. to 4in. in diameter; sepals and petals yellow, or yellowish-green, transversely banded with dull reddish-brown, narrow; lip narrow, somewhat spoon-shaped, bright yellow, dotted near the margin with cinnamon; scape tall, branched, bearing from five to ten blossoms. Winter. Mexico, 1840. This greatly resembles *O. grande* in habit, but its pseudo-bulbs are more compressed, longer, and fluted. SYN. *O. Lawrenceanum,* of gardens. (B. O. 4.)

O. I. leopardinum (leopard-spotted). *fl.*, sepals and petals deep yellow, barred across with bands of reddish-crimson; lip beautifully bordered all around with spots and dots of the same dark colour. Mexico, 1876. A very beautiful variety, richer in its markings than the type. (R. G. 856.)

O. I. pantherinum (panther-spotted). *fl.*, sepals and petals chestnut-brown, with paler margin; the whole of the lip arabesqued with red and yellow. A fine variety.

O. I. splendens (shining). *fl.*, sepals and petals rich shining brown, tipped with yellow; lip large, yellow, spotted with purple. Mexico, 1868. A very fine form.

O. Josephinæ (Josephine's). A synonym of *O. crispum Andersonianum.*

O. Karwinskii (Karwinski's). A synonym of *O. læve.*

O. Kegeljani (Kegeljan's). *fl.* arranged in a close raceme; sepals and petals yellow, elliptic-lanceolate, acute, the former incurved and marked with two or three red-brown blotches; lip oblong, cuspidate, concave, with serrulated margins, the base, apex, and margins white, and the rest reddish-brown. Peru, 1878. Nearly related to *O. triumphans.* (B. H. 1877, 10.)

O. Krameri (Kramer's).† *fl.* of a very pretty violet colour, the lip marked and spotted with yellow and purple, and having two lines of rich dark brown near the column; sepals and petals ligulate, obtuse; lip somewhat reniform, and deeply notched in front; peduncles drooping, freely produced, and usually three-flowered. Pseudo-bulbs somewhat flat, with sharp edges, sometimes almost spherical, at others ovate, pale green, and bearing but one leaf. Costa Rica, Mexico, 1868. A very pretty, but rare, species. (B. M. 5778; B. O. 24; F. M. 1868, 406; I. H. 562; W. O. A. i. 40.)

O. K. Smithianum (Smith's). *fl.* ivory-white, having a sulphur-coloured, reddish-spotted callus on the lip, and an orange transverse line, resembling two crescents, in front of it.

O. læve (smooth).* *fl.* very fragrant when first expanded, 2in. to 2½in. across, numerous, in slightly-branched racemes; sepals and petals cinnamon-brown, banded with yellow, the dorsal sepal and petals ascending, the lateral sepals deflexed; lip white and violet, smaller and shorter than the sepals, sessile, fiddle-shaped. *l.* 6in. to 10in. long, oblong-lanceolate, acute. Pseudo-bulbs 3in. to 4in. long, 2in. to 2½in. broad. Guatemala, 1841. (B. M. 6265; B. O. 16; B. R. 1844; I. H. 1859, 213.) SYNS. *O. Karwinskii, O. Reichenheimii* (B. O. 15).

O. Lawrenceanum (Lawrence's), of gardens. A synonym of *O. Insleayi.*

O. lepidum (elegant). *fl.*, sepals and petals at first yellow, afterwards changing to white, with yellow edging, the former with two or three brown spots, the latter with only one; lip cuneate-hastate at base, with a long central claw and a reniform, apiculate front lobe, a brown spot in front of the keels; panicles short, many-flowered. Pseudo-bulbs round, rather flat. Columbia, 1884.

O. Lindenii (Linden's).* *fl.* yellow; sepals and petals unguiculate, lanceolate, undulated, acute; lip ovate-lanceolate; crest fleshy, glabrous, having four irregular flaps placed below the finger-like processes of its extremity; scape 2ft. to 3ft. high, with uniform lateral arms for more than half its length, each arm bearing from five to seven flowers. *l.* nearly 1ft. long, erect, ensiform. New Grenada, 1852. SYN. *O. platyodon.* (F. M. n. s. 333.)

O. Lindleyanum (Lindley's). *fl.* disposed in racemes; sepals and petals yellow; lip white, curiously lobed. *l.* lanceolate. Pseudo-bulbs flattened. New Grenada, 1865. (B. O. 11.)

O. L. Coradinei (Coradine's). *fl.* from 2in. to 3in. across; sepals and petals pale yellow, with two or three chestnut-brown blotches; lip creamy-white, with a large irregular blotch on its

Odontoglossum—*continued.*

disk, and a few smaller spots near its base; spike few-flowered. (G. C. 1872, 1068; W. O. A. ii. 90.)

O. L. ligulare (strap-like). *fl.*, sepals and petals orange-yellow, with two or three large brown blotches; lip having an orange claw, and a hastate-ligulate, blunt, yellow blade, with a large brown blotch on its disk. 1882. A very handsome plant.

O. L. mirandum (extraordinary). This differs from the type in its stiff, one-sided raceme, well-developed, rhomboid, serrate column-wings, lanceolate leaves, and large, plump pseudo-bulbs. Columbia, 1882.

O. Londesboroughianum (Lord Londesborough's).* *fl.* light yellow, racemose; sepals and petals oblong, the latter crisped; lip transversely reniform, having on each side of its base a small, blunt, narrow, retrorse auricle; column yellow, wingless, bent. Mexico, 1876. SYN. *O. oncidioides.* (F. M. n. s. 246; W. O. A. ii. 82.)

O. Luddemannianum (Luddemann's). A synonym of *O. maculatum.*

O. luteo-purpureum (yellow-purple).* *fl.* about 2½in. across; sepals and petals lanceolate, acuminate, most frequently rich brown or purple, more or less blotched and banded with white or light yellow, and having a golden-yellow border; lip white, with a brown base, minutely serrate; scape longer than the leaves, many-flowered, simple or branched, and from 1ft. to 3ft. long. Winter and spring. *l.* oblanceolate, often of a bronzy colour. Pseudo-bulbs conical, slightly compressed, two-leaved. New Grenada. A species of robust habit, and extremely variable both in size of flowers and in the intensity of their markings; so much so, that hardly two specimens are alike. SYNS. *O. hystrix, O. lyroglossum, O. radiatum.* (B. O. 17.)

O. l.-p. amplissimum (very large). A fine variety, with very broad sepals and petals, of a clear light yellow, with a few brown streaks at the base, and a few large brown blotches on the disk. 1882.

O. l.-p. cuspidatum (cuspidate).* *fl.* yellow, tinted with rich chestnut-brown, and with a white lip, large; sepals and petals rather narrow, lanceolate, acuminate, spreading; lip ligulate, acuminate, wavy, and toothleted, with several split crests in front of the great square mark in the centre. Columbia, 1881. (R. X. O. 184, 1.)

O. l.-p. facetum (well-formed). *fl.*, sepals light yellow, with very large, rather cinnamon-coloured blotches, lanceolate, straight; petals lanceolate, straight, with numerous fine teeth, light yellow, covered with numerous small cinnamon-coloured blotches; lip almost circular, short, finely fringed, convolute, undulate, light yellow, having a radiating semicircle of keels; column with very multifid wings.

O. l.-p. mulus (mule).* *fl.* bright yellow, with cinnamon-brown spots. New Grenada, 1878. A very fine plant. SYNS. *O. histrionicum, O. Holfordianum.* (G. C. n. s., xix. 469; R. X. O. ii. 160.)

O. l.-p. sceptrum (sceptre). *fl.*, sepals larger than the petals, deep chocolate-brown, streaked and margined with yellow; petals irregularly lobed at the edges, golden, with two or three large chestnut-brown blotches; lip yellow, with serrated edge, dotted and blotched with chocolate. New Grenada, 1872. (I. H. 73.)

O. lyroglossum (lyrate-lipped). A synonym of *O. luteo-purpureum.*

O. maculatum (spotted).* *fl.* of a soft deep yellow, beautifully barred or spotted towards the centre with rich brownish-crimson, measuring 3in. to 4in. across; sepals lanceolate; petals much broader; lip cordate, large, spreading, yellow, spotted with brown; clusters pendent, consisting of about six blossoms. Spring. Pseudo-bulbs short, thick. Mexico, 1838. A lovely species, the habit of which is very similar to that of *O. cordatum.* SYNS. *O. anceps* (I. H. 128), *O. Luddemannianum* (R. G. 1859, 275). (B. M. 6455; B. O. 20; B. R. 1840, 30; W. O. A. ii. 52.)

O. m. polyodon (many-toothed). A synonym of *O. m. erosum.*

O. maculatum (spotted), of Hooker. A synonym of *O. cordatum.*

O. madrense (Sierra Madre). A synonym of *O. maxillare.*

O. marginellum (slightly margined). *fl.*, sepals and petals light ochreous colour, spotted with brown; lip dark reddish-brown, with a yellow margin and yellow-tipped calli. 1883.

O. maxillare (jawbone).*† *fl.*, sepals and petals white, with a large purplish-brown blotch at the base; lip orange, margined with white, and having a brown spot in the centre. Summer. Pseudo-bulbs light green. Mexico, 1846. A very distinct and handsome species. SYN. *O. madrense* (I. H. 480; W. O. A. ii. 71). (B. M. 6144.)

O. maxillare (jawbone), of gardens. A synonym of *O. nebulosum.*

O. membranaceum (membranous). A synonym of *O. Cervantesii.*

O. Murrellianum (Murrell's). *fl.*, sepals and petals white, slightly tinged and spotted with purplish-violet. Columbia, 1875. A pretty natural hybrid.

O. M. cinctum (girded). *fl.* white, racemose; sepals and petals bordered with lilac; lip with some lilac spots on the front lobe, the base with a large yellow callus and some red spots. 1883. (R. G. 1101.)

Odontoglossum—*continued.*

O. nævium (speckled). *fl.* pure white, speckled and spotted with purplish-crimson; sepals and petals about 2in. long, lanceolate, beautifully crisped or waved; spike arching, 1ft. to 1½ft. long, and from ten to sixteen-flowered. May and June. *l.* oblong, narrow. Pseudo-bulbs oblong, flattened, deep green. New Grenada, 1842. A beautiful species. (B. O. 9; L. & P. F. G. i. 18; R. G. 791.)

O. nebulosum (clouded).† *fl.* white, more or less spotted with brown, 2in. to 4in. across; sepals and petals 1½in. to 2in. long, 1in. to 1½in. broad, oblong, slightly incurved; lip cordate, with a lemon-yellow, bilobed crest, and a few brown spots; spikes stout, five to seven-flowered. March to May. Pseudo-bulbs roundish, two-leaved. Mexico. SYN. *O. maxillare*, of gardens (I. H. 1859, 200). The figures and descriptions of *O. maxillare* and *O. lævе* are, in the work last named, curiously out of place; the description of *O. maxillare* is opposite the plate of *O. lævе*, and that of *O. lævе* is opposite figure of *O. maxillare*. (B. O. 1; G. C. 1867, 572.)

O. n. candidissimum (very white). A variety with entirely white flowers. 1884.

O. n. candidum (white). A free-growing form, having the flowers pure white, with the exception of the yellow crest and a few brown spots on the lip. 1867.

O. n. guttatum (spotted). A fine variety, having the basal half of the sepals and petals, and the greater part of the lip, spotted with reddish-brown. 1884.

O. n. pardinum (panther-like). A desirable form, having the flowers more densely spotted or blotched with brown. Columbia, 1873.

O. n. Pattisonianum (Pattison's). *fl.* snow-white, large, with a yellow callosity on the lip.

O. nevadense (Sierra Nevada). *fl.* large, disposed on long spikes; sepals and petals chocolate-brown, margined and tipped with yellow, and streaked with the same colour; lip white; middle lobe cordate, and slightly serrate at the edge, side lobes spotted with brown inside. Pseudo-bulbs dark green, bearing leaves which are narrow at the base. Columbia, 1871. A very rare species, distinguished by the singular crescent shape of the base of the lip in front of the stalk. (I. H. ser. iii. 45; W. O. A. iii. 131.)

O. nobile (noble). A synonym of *O. Pescatorei.*

O odoratum (sweet-scented).* *fl.* yellow, spotted and blotched with chocolate-brown, very fragrant, 1½in. to 2in. across; sepals and petals lanceolate-acuminate, with undulated edges; lip lanceolate-trilobed, white, with a purple base; scape erect, branched, many-flowered. Winter and spring. Pseudo-bulbs ovoid, two-leaved. Sierra Nevada. A rare species. SYN. *O. gloriosum* (B. O. 12). (B. M. 6502.)

O. o. baphicantum (dyer's). *fl.* yellow, with purple blotches finely suffused over the whole of the sepals, petals, and lip; lip pandurate, cuspidate, serrate; column with an apiculate, serrate, cuspidate wing. Columbia, 1876.

O. o. deltoglossum (deltoid-lipped). *fl.* sulphur-coloured, with brown blotches and smears; sepals and petals spreading, lanceolate, acuminate, undulate; lip deltoid, with very short margin, lobed, wavy, toothleted, sulphur, with an orange base, little brown stripes on each side of the base, and a much larger brown obcordate blotch on the disk; column slender, with single tendril-like wings, whitish-yellow, with brown in front; raceme slender.

O. o. hebraicum (Hebrew-marked). *fl.* pale yellow, with brown spots and irregular stripes, twice as large as those of typical *O. odoratum;* lip darker yellow at base, with a cordiform, maroon-brown central blotch, and some spots and stripes of the same colour; callus bifid, with an erect apiculus in sinus, and four teeth on each side. 1879. (W. O. A. ii. 85.) The sub-variety *lineoligerum* has the letter-like markings broken up into spots and lines. (W. O. A. v. 84.)

O. o. latimaculatum (broad-spotted). A distinct variety, having deep golden flowers, which are very heavily blotched with bright crimson-brown. Columbia, 1871. (I. H. 1870, 39.)

O. o. Leeanum (Lee's).* *fl.*, sepals and petals bright yellow, with numerous brown spots, lanceolate, acuminate; lip long and narrow, bright yellow, with a paler disk and a few brown spots. 1882.

O. Oërstedii (Oërsted's).* *fl.* white, solitary, or in twos, the callus of the lip and the disk before the column yellow, with a few red spots; the column has very small, triangular, blunt auricles at each side of the base of the stigmatic cavity. Pseudo-bulbs roundish, two-edged, clothed with brown spathes, growing in dense masses, and having each a single, oblong, stalked leaf. Costa Rica, 1877. (B. M. 6820; Gn. xxvi. 454.)

O. oncidioides (Oncidium-like). A synonym of *O. Londesboroughianum.*

O. pardinum (panther-spotted).† *fl.* pure golden-yellow, with numerous brown blotches, disposed in wide panicles. December. *l.* elliptic-oblong. Pseudo-bulbs ovate-compressed. Peru, 1867. (B. M. 5993.)

O. pendulum (pendulous). A synonym of *O. citrosmum.*

Odontoglossum—*continued.*

O. Pescatorei (Pescatore's).* *fl.*, sepals and petals usually snow-white; lip panduriform, white, blotched at the base with purplish-crimson and yellow; spikes, or panicles, 1ft. to 2ft. long, erect or drooping, bearing from ten to 100 flowers. Spring. *l.* 6in. to 12in. long. Pseudo-bulbs thick, speckled with brown, two-leaved. New Grenada, 1851. A very lovely species, and one of the best of the genus. SYN. *O. nobile.* (B. O. 5; F. d. S. xvi. 24; Gn. xxvi. 452; R. G. 835; W. O. A. ii. 168.) Other forms than those enumerated have been called *aurantiacum, flaveolum, purpuratum,* in reference to the colour of the flower or parts of it.

O. P. excellens (excelling). *fl.*, sepals yellow, blotched with purple, the odd one with a white central area; petals broader, white, with yellow margins; lip pandurate, white, with yellow crests and purple blotches. 1882. (Gn. xxi. 330.)

O. P. Veitchianum (Veitch's). A handsome variety, with broad mauve zonal bands and blotches, two on each sepal and petal. With this may be grouped *elegans, Lawrenceanum* (Hort.), *limbosum, Lowianum, Schrœderianum,* and *Thomsonianum,* all differing more or less from it in the form and extent of the blotches on the floral segments.

O. Phalænopsis (Phalænopsis). A synonym of *Miltonia Phalænopsis.*

O. platyodon (broad-toothed). A synonym of *O. Lindenii.*

O. polyxanthum (very yellow flowered). *fl.* 3in. to 4in. in diameter; sepals and petals yellow, blotched with chocolate; lip roundish, cuspidate, yellow at base, brownish-purple in front, and whitish-edged; spike 2ft. long. Ecuador (at 8000ft. altitude), 1881. (F. M. n. s. 453; G. C. xvi. 461, xix. 761.)

FIG. 717. ODONTOGLOSSUM ROSSII, showing Habit and detached Single Flower.

O. prænitens (shining forth). *fl.* bright golden-yellow, blotched with brownish-purple, lax, 2in. in diameter; sepals and petals nearly equal, elliptic-lanceolate, acuminate, rather waved; scape six to eight-flowered. *l.* 6in. to 8in. long, recurved, narrow, linear-oblanceolate. Pseudo-bulbs 2in. long, narrowly oblong, slender, much flattened. Columbia, 1874. (B. M. 6229.) Most of the plants in cultivation under the name of *O. prænitens* are referable to *O. facetum,* of Reichenbach.

O. præstans (distinguished). *fl.* yellowish, panicled; upper half of the linear-lanceolate sepals and petals maroon-brown; lip trifid, the basal lobes ciliated, and the four crests of the disk toothed, the inner ones aristate. *l.* linear-lanceolate, acute. New Grenada, 1875. Allied to *O. odoratum.*

O. pulchellum (pretty).*† *fl.* of a crystalline whiteness, very fragrant, about 1in. across; lip white, curiously bent or twisted, having a crest shaped like a W, of a clear lemon-yellow, with a few purple dots; spikes erect, about 1ft. high, and from ten to twelve-flowered. Spring. *l.* in pairs, dark green, very narrow. Pseudo-bulbs dark green, ovoid. Mexico, 1841. (B. M. 4104; B. R. 1841, 48.)

O. p. majus (greater).* A very robust form, having the pseudo-bulbs much larger, and the flowers fully double the size of the typical species. A most desirable plant.

O. purum (pure). A synonym of *O. Wallisii.*

O. radiatum (rayed). A synonym of *O. luteo-purpureum.*

O. ramosissimum (much-branched). *fl.* white, all parts being spotted, in different varieties, with deep violet, purple, or lilac; panicles large, much branched. *l.* long, linear-ligulate. Pseudo-bulbs oval, compressed. Venezuela, 1875. A showy orchid.

Odontoglossum—*continued.*

O. r. xanthinum (yellow). *fl.* yellow; sepals and petals twisted, streaked and spotted with mauve-purple; callus of lip ochre, with mauve-purple radiating rays around and before it. Columbia, 1880. A pretty variety.

O. Reichenheimii (Reichenheim's). A synonym of *O. læve.*

O. Roezlii (Roezl's). A synonym of *Miltonia Roezlii.*

O. Rossii (Ross').* *fl.* from 1in. to 2in. across; sepals lanceolate, about 1in. long, white, transversely barred with brown; petals sub-hastate, much broader than the sepals, pure white, with a few spots at their bases only; lip oblong or cordate, pure white, with a lemon-yellow, bilobed crest; column white; scapes from two to five-flowered. Winter. Pseudo-bulbs angular. Mexico, 1839. SYN. *O. acuminatum.* See Fig. 717. (B. R. 1839, 48; F. d. S. 2110; Gn. xxviii. 507.)

O. R. aspersum (sprinkled).† *fl.*, sepals whitish-yellow, mottled with brown blotches, keeled on the back; petals broader, whitish-yellow, with a few brown spots at the base; lip whitish, the basal callus yellow, with brown lines; bracts short and broad. 1879.

O. R. Ehrenbergii (Ehrenberg's).*† *fl.*, sepals pure white, narrow; petals white, barred with brown at base; lip white. Autumn and winter. Pseudo-bulbs and leaves small, dark green. Peru, 1842. A very pretty little variety, which may be grown in a rustic basket, suspended from the roof of a Wardian case. (F. d. S. 846; I. H. i. 30.)

O. R. Humeanum (Hume's). *fl.*, sepals yellow at their ends, with cinnamon bars, triangular-acuminate; petals oblong-acuminate, crisped, white, with three sepia-brown blotches at their base; lip two-lobed, white, with a yellow callus, striped inside with red; peduncle two-flowered. 1876.

O. R. musaicum (mosaic). A very handsome form, the violet petals having their lower halves covered by a large and beautiful blotch, green and yellow, and the lobes streaked and dotted.

O. R. rubescens (ruddy). A grand variety, with large, light, rose-coloured flowers, richly marbled with dark purple, turning to chestnut-brown. 1881.

O. R. Warnerianum (Warner's).* *fl.*, sepals and petals pure white, with a few brown spots; lip white, shaded with rose, and having a yellow blotch at the base; scape longer than the leaves, four or five-flowered. Autumn and winter. *l.* one on each pseudo-bulb, less than 9in. long, membranous, sharp-pointed, narrowed at the base into a channelled petiole. Mexico, 1865. A very handsome, dwarf species. (B. O. 13; G. C. 1865, 579.)

O. Schillerianum (Schiller's).* *fl.*, sepals and petals yellow, blotched with brown, or sometimes nearly all brown, cuneate-oblong, acute; lip with small, upright basal lobes, and an oblong-acute, wavy, velvety front lobe, yellow, with a purple blotch and two blunt calli on the disk. 1884. A fine species. (R. X. O. i. 22.)

O. Schlieperianum (Schlieper's). *fl.* pale yellow, blotched and barred with a deeper shade of the same colour, or almost destitute of spots; scapes erect, many-flowered. Autumn. New Grenada, 1856. This species very closely resembles *O. grande* in habit and growth. (F. M. 461; G. C. 1865, 1082; R. G. 605; R. X. O. ii. 143.)

O. Schrœderianum (Schrœder's). *fl.*, sepals and petals white, with mauve-purple blotches, oblong, acute, wavy; lip pandurate, white, with two mauve-purple blotches on the disk; callus having a plate of radiating spines on each side, yellow, with red spots. 1882. A distinct hybrid, in the way of *O. tripudians.*

O. stellatum (starry-flowered). *fl.* pale yellow, barred with brown; sepals and petals about 1in. long; lip white, somewhat concave, very much jagged round the margin; scapes about 4in. high, one-flowered. June. Pseudo-bulb 2in. to 3in. long, one-leaved. Mexico, 1839. A pretty, but not very showy, species. (B. O. 13.)

O. tentaculatum (tentacled). *fl.*, sepals and petals yellow, spotted with white, narrow, without angles; lip whitish, with a large, brown spot on the disk, and some small ones at the base, pandurate-lanceolate, acute. 1883.

O. tetraplasium (four-formed). *fl.* white, with purplish spots, growing on diffuse panicles, and equalling in size those of good forms of *O. odoratum.* Peru, 1875. Allied to *O. Weirii.*

O. tripudians (dancing).* *fl.* 2in. in diameter, brown, with yellowish-green edges and a few dots; sepals and petals nearly equal, lanceolate; lip oblong, acuminate, with a white basilar disk; the region about the calli of a beautiful purplish-violet; column whitish, with purplish-brown wings. Columbia, 1871. (B. M. 6029; F. M. m. s. 208.)

O. t. cinctum (girded). *fl.*, sepals and petals yellow, blotched with maroon; lip very broad, white, with a large brown blotch and smaller ones beside it. 1883.

O. t. Harryanum (Mr. Harry Veitch's). In this form, the sepals and petals are almost blackish inside, tipped with light yellow; the lip is light yellow, and mauve at the base. 1883.

O. t. oculatum (eyed). *fl.*, lip white, pandurate, crisped, marked with violet around the crest, and with a large brownish-violet blotch in front.

Odontoglossum—*continued.*

O. t. xanthoglossum (yellow-lipped). A variety with a totally yellow lip, mauve blotches, and the crests only pure white. 1881.

O. triumphans (triumphant).* *fl.* large and thick in substance, measuring upwards of 3in. in diameter; sepals and petals bright golden-yellow, blotched with deep brownish-crimson; lip cordate, the front portion deep warm rose-colour, and the basal half pure white, with a yellow centre; scape erect, many-flowered, branched. Spring. Pseudo-bulbs short, thick, speckled with brown, and bearing shining bright green leaves. Tropical America, 1867. A splendid species, of which there are several very desirable varieties. (B. O. 23; I. H. 609; W. O. A. 258.)

O. Uro-Skinneri (Ure Skinner's).* *fl.*, sepals and petals oblong, light green or greenish-yellow, freckled with reddish-brown spots, 1½in. across; lip broad-cordate, white, thickly covered with soft blue spots, and sometimes tinged with red; spikes simple, 2ft. to 3ft. high, from ten to twenty-flowered. Latter part of summer and autumn. Pseudo-bulbs thick, bearing broad lanceolate leaves, 9in. to 12in. in length. Guatemala, 1854. A bold, free-growing species, very distinct in its colouring. It is closely allied to *O. bictonense*, but may be distinguished by the broad pseudo-bulbs, which become covered, in their second year, with a multitude of small, reddish dots; its wide sepals and petals; and the spotting of the lip. (B. O. 2.)

O. velleum (fleecy). *fl.*, sepals and petals yellow, with brown streaks; lip whitish, with numerous violaceous stripes and blotches. *l.* about 6in. long. Pseudo-bulbs narrow, flat. Ecuador, 1874.

O. vexativum (provoking). *fl.*, sepals chestnut-brown, broad; petals broader, white, spotted with olive-green at the base; lip with a broad, semi-ovate blade, white, with a few olivaceous spots; callus yellow, with small red blotches; column white, wingless, tomentose; inflorescence large; bracts spathaceous. Mexico, 1877. A beautiful orchid.

O. vexillarium (standard). A synonym of *Miltonia vexillaria.*

O. Victor (Victor). *fl.*, sepals and petals yellow, with brown spots, spreading, wavy, and twisted; lip white, with brown blotches, pandurate, denticulate. 1883. This plant bears great similarity to *O. Hallii.*

O. Wallisii (Wallis'). *fl.* 2in. to 3in. across; sepals and petals oblong, about 1in. long, golden-yellow, blotched with rosy-purple; lip straw-coloured, with a rosy blotch near the apex, partially adnate to the column, and having the crest, margin, and apex white; spike erect or arching, five to ten-flowered. *l.* very narrow, grass-like, 9in. to 12in. long. Pseudo-bulbs ovoid, two-leaved. Columbia, 1870. SYN. *O. purum.* (I. H. n. s. 56.)

O. Weirii (Weir's). *fl.* white, marked with lilac or purple, disposed in diffuse panicles; lip wavy, oblong, acute, velvety on the surface. New Grenada, 1875.

O. Weltoni (Welton's). A synonym of *Miltonia Warscewiczii.*

O. Wilckeanum (Herr Wilcke's).* *fl.* of a very light whitish-yellow; sepals triangular, crisp; petals oblong, triangular, much broader, with some projecting angular laciniæ; both sepals and petals have elegant brown blotches, which are transverse in the former and marginal in the latter; lip similar to that of *O. crispum*, with three to five small tendril-like processes each side, and two ragged keels, which are free at their ends, including an intermediate apiculus, orange at the base, elsewhere lightest yellow, with some brown blotches; column pale whitish-yellow, with a few brown spots; peduncles bearing a raceme of about five flowers. 1878. A very handsome hybrid, just intermediate between *O. crispum* and *O. luteo-purpureum.* (G. C. n. s., xxi. 640.)

O. W. sulphureum (sulphur-coloured). *fl.* sulphur-coloured, having a few red blotches and lines on the lip, and one or two on the lateral sepals. 1884.

ODONTOLOMA. Included under **Davallia** (which *see*).

ODONTOSORIA. Included under *Davallia.*

ODONTOSPERMUM (from *odous, odontos,* a tooth, and *sperma,* a seed; the pappus of the seeds is toothed). SYNS. *Asteriscus, Nauplius.* ORD. *Compositæ.* A genus comprising about eight species of hardy or greenhouse, annual or perennial herbs, rarely shrubby, natives of the Mediterranean and Canary region, from the Orient to the Cape de Verde Islands. Flower-heads yellow, mediocre or rather large, heterogamous; involucre hemispherical or broadly campanulate; receptacle slightly convex; achenes villous or glabrescent. Leaves opposite, entire, or rarely toothed or sub-pinnatifid. The first of the undermentioned species requires similar treatment to that found necessary for common hardy annuals: sow the seeds in the open border, in spring, and thin

Odontospermum—*continued.*

out the seedlings somewhat, if too thick, to allow each plant to develop. *M. sericeum*, a handsome dwarf shrub, does well in a cool greenhouse, in a compost of well-drained turfy loam and leaf mould, and is propagated by cuttings of the half-ripened young shoots.

O. aquaticum (aquatic). *fl.-heads* sessile, axillary and terminal. July. *l.* oblong, obtuse, villous or slightly glabrous. Stem erect, di- or trichotomous. *h.* 6in. South Europe, 1731. Hardy annual. (S. F. G. 899, under name of *Buphthalmum aquaticum.*)

O. sericeum (silky). *fl.-heads* terminal and lateral, sessile. June. *l.* cuneate or linear, entire, silky-villous. Stem shrubby, branched. *h.* 4ft. Canaries, 1779. Greenhouse. (B. M. 1836, under name of *Buphthalmum sericeum.*)

ŒCEOCLADES. Included under **Saccolabium** (which *see*).

ŒCEOCLADES FALCATA. An old name of *Angræcum falcatum.*

ŒDEMONE. A synonym of **Herminiera** (which *see*).

ŒDERA (named in honour of George Œder, 1728-1794, Professor of Botany at Copenhagen). ORD. *Compositæ.* A small genus (four species) of greenhouse shrubs, confined to South Africa. Flower-heads yellow, brownish at back, heterogamous, sessile at the apices of the branches or between the uppermost leaves, solitary or few; receptacle small; achenes glabrous. Leaves opposite, clustered, imbricated, or squarrose, short, sessile, coriaceous, entire, often scabrous ciliated. The undermentioned species succeeds in sandy loam, with the admixture of a little peat. Propagation may be effected by cuttings, inserted in sandy soil, under a hand glass, in heat.

Œ. prolifera (proliferous). *fl.-heads* yellow; ray-florets dark purplish-maroon at back. May and June. *l.* lanceolate, opposite, ciliated, glabrous on both sides, reflexed. *h.* 1ft. 1789. (B. M. 1637.)

ŒNOCARPUS (from *oinos*, wine, and *karpos*, a fruit; some of the species yield palm wine and oil). ORD. *Palmæ.* A genus, sometimes confused with *Euterpe*, comprising eight species of stove, South American Palms, often unarmed and tall. Flowers monœcious, in Broom-like spikes, springing from beneath the leaves, and enveloped in double woody caducous spathes. Fruit often purple or black, oval or nearly round, with a granular, fibrous, oily flesh; one-seeded. Leaves in terminal crowns (in one species distichous), pinnate; segments narrow, or, rather, broad-ensiform, acuminate, rigid, and somewhat crisped; petioles short, and somewhat crisped. The species thrive best in a compost of peat and loam in equal parts. Propagated by seeds, or by suckers. The species here described are probably the only ones yet introduced.

Œ. Bacaba (Bacaba). *fl.*, calyx thrice as short as the corolla; laciniæ ovate-lanceolate; petals oblong, acute. Berry purplish-blue, sub-globose. *l.* sparse; pinnæ linear-lanceolate. Trunk naked, 50ft. to 60ft. high.

Œ. Bataua. Patana Palm. *fl.*, male calyx four times as short as the oblong and slightly acute petals. *fr.* cylindrical-elliptic, obtuse. *l.* dark green, pinnate, about 1½ft. long, not produced in great abundance. Stem naked. *h.* 40ft. 1820. An elegant species.

Œ. minor (lesser). *fl.*, male calyx four times as short as the petals; spathes woody, outer one narrow-lanceolate, inner usually cylindrical, 1ft. or more long; spadix fuscous, with branches 1ft. or more long. *fr.* blackish-purple, as large as a Hazel-nut, ovate-acute. *l.* scattered, six to ten, erecto-patent or horizontally spreading, 6ft. to 8ft. long; pinnæ 6ft. to 8ft. long, rather remote, the lower ones nearly alternate, the upper ones opposite and horizontally spreading, with a very long and acute mucrone. Trunk 10ft. or more high, naked, slender, flexuous.

ŒNOTHERA (from *oinos*, wine, and *thera*, a hunt or eager pursuit; an old Greek name given by Theophrastus to some plant, probably an Epilobium, the roots of which were eaten to provoke a relish for wine). Evening Primrose. Including *Godetia*, *Hartmannia* and *Sphærostigma.* ORD. *Onagrarieæ.* A genus comprising

Œnothera—*continued.*

about 100 species of herbs or small shrubs, of variable habit, natives of extra-tropical north and north-western South America, one being Tasmanian; a few of the American species are naturalised over the warmer regions of the globe. Flowers yellow, pink, or purple, usually large and showy, solitary, axillary, sessile, or pedunculate; petals four, scarcely clawed, obovate or obcordate. Leaves membranous, sessile or petiolate, entire, dentate, lobed, or pinnatifid. All the undermentioned species are most desirable plants for summer and early autumnal flowering, and are of very easy culture in any rather sandy soil. Many of the species and varieties are amongst the most beautiful and attractive of hardy plants; their flowers are large, showy, and pleasingly fragrant. The plants are most suitable for the margins of shrubberies, mixed borders, and similar situations, preferably in warm, sunny positions. Propagation is easily effected by divisions in early spring; or by seed, sown in spring for flowering the same year, or in July for treating as biennials. Cuttings of the perennial species may also be inserted in pots, and placed in a cool frame, in the early part of the season, before flowering begins. Perennial, except where otherwise specified.

FIG. 718. ŒNOTHERA ACAULIS, showing Habit and detached Leaf and Flower.

Œ. acaulis (stemless).* *fl.* white, fading into red, large, with obovate, rather retuse, entire petals. May to September. *l.* rosulate, pinnatifid; the terminal lobe large and denticulated. *h.* 6in. Chili, 1821. See Fig. 718. (B. R. 763, under name of *Godetia acaulis.*)

Œ. albicaulis (white-stemmed). *fl.* white, becoming pinkish as they grow older, few, axillary; petals obcordate, large, as long as the tube. June. *l.* linear to oblong-lanceolate, sessile, or alternate at base, or abruptly petioled, entire, or repand-denticulate, or sinuate-pinnatifid towards the base. Stems decumbent. *h.* 6in. to 12in. California, &c. See Fig. 719 (1). SYN. *Œ. pallida* (B. R. 1142). (R. G. 1041.)

Œ. amœna (pleasing).* *fl.* rose, with four crimson spots. Summer. *l.* linear-lanceolate, entire. Stem ascending, diffuse, branched. *h.* 1ft. to 2ft. North-west America, 1826. Annual. (B. M. 2832, under name of *Œ. Lindleyi.*)

Œ. a. rubicunda (ruddy).* *fl.* lilac-purple, having a deep-coloured blotch at the base of each petal. *h.* 2ft. California, 1834. Plant erect. One of the best, and the parent of several varieties

Œnothera—*continued.*

FIG. 719. FLOWERING BRANCHLETS OF (1) ŒNOTHERA ALBICAULIS, AND (2) ŒNOTHERA CALIFORNICA.

including a handsome lilac and crimson-flowered form known as "The Bride." See Fig. 720. (B. R. 1856, under name of *Godetia rubicunda.*)

FIG. 720. FLOWERING BRANCH OF ŒNOTHERA AMŒNA RUBICUNDA.

Œ. anisoloba (unequal-lobed). *fl.* white, becoming red as they fade, large, with a very long tube; petals imbricated, with crenulated margins. May to October. *l.*, radical ones elliptic, entire or few-toothed; middle ones elliptic, sharply toothed, segments at base variable; upper ones unequal, pinnatifid. Stem suffruticose. *h.* 3ft. Chiloe, 1828. (B. R. 1479.)

Œnothera—*continued.*

Œ. biennis (biennial).* Common Evening Primrose. *fl.* pale yellow, large, delicately fragrant, with broadly obcordate petals. Summer and autumn. *l.*, radical ones oblong-lanceolate, cauline ones ovate-lanceolate, toothed, pubescent. Stem erect, branched. *h.* 2ft. to 4ft. North America. Biennial. One of the commonest species, of which the variety known as *grandiflora*, or *Lamarckiana* (see Fig. 721), has larger and finer flowers.

FIG. 721. PORTION OF INFLORESCENCE AND LEAF OF ŒNOTHERA BIENNIS LAMARCKIANA.

Œ. bifrons (two-faced). *fl.* yellow, large, handsome, sessile, solitary, axillary; petals roundish, much puckered. Autumn. *l.* alternate, nearly glabrous, semi-amplexicaul; lower ones ovate, acuminate; upper ones smaller. Stem nearly erect, green, often tinged with purple. *h.* 1½ft. Texas, 1835. Biennial. (B. M. 3764.)

Œ. bistorta Veitchiana (twisted-fruited, Veitch's).* *fl.* solitary in the axils of the leaves and bracts; petals full yellow, with small, deep, blood-coloured spots at base, spreading. Summer. *fr.* 1½in. to 2in. long, twisting with maturity. *l.* rather distant; lower ones shortly petiolate, lanceolate; upper ones broader and sessile. Stems simple or branched, sub-decumbent. South California. Annual. (B. M. 5078.)

Œ. cæspitosa (tufted). *fl.*, petals pinkish-white, large, profoundly obcordate. June. *l.* lanceolate, inciso-dentate. *h.* 1ft. North America, 1811. Plant almost stemless. (B. M. 1593.)

Œ. californica (Californian).* *fl.* varying from white to pale pink, with yellowish centre, 1½in. to 3in. in diameter, opening at night, very fragrant. July. Stems often 2ft. long, from an elongated, horizontal rootstock. A near ally of *Œ. albicaulis.* See Fig. 719 (2).

Œ. cardiophylla (heart-leaved). *fl.* yellow, funnel-shaped, disposed in loose terminal racemes; tube about 2in. long; limb 1in. across. *l.* cordate, toothed. Stems 1ft. high. California, 1883.

Œ. cheiranthifolia (Wallflower-leaved). *fl.* yellow, small, sessile. July. *l.* sessile, spathulate, obtuse, almost entire, villous. Stem much branched, ascendent, hirsute. *h.* 1ft. Chili, 1823. Annual. (B. R. 1040.)

Œ. eximia (choice).* *fl.* white, 4in. in diameter, with very long and slender calyx tubes. July. *l.* numerous, lanceolate, pubescent. Root fusiform. *h.* 9in. to 12in. Rocky Mountains of Upper California, 1870. A magnificent dwarf-growing species. See Fig. 722. (B. M. 5828, under name of *Œ. marginata.*)

Œ. fruticosa (shrubby). *fl.* deep yellow, large, with broadly obcordate, erose petals; racemes spicate, leafy, rather naked at base. June to September. *l.* ovate-lanceolate, denticulated. Stems erect, branched at the apex. *h.* 2ft. to 3ft. United States, 1737. (B. M. 332.)

Œ. f. ambigua (ambiguous). *fl.* rather pale yellow, at first corymbose, afterwards racemose, large for the size of the plant. July. (B. M. 3545.)

Œ. glauca (glaucous).* *fl.* pale yellow, large, with obcordate, erose petals. June to October. *l.* ovate, repandly toothed. *h.* 1ft. to 2ft. United States, 1812. Plant quite glabrous, decumbent, glaucous. (B. M. 1606.)

Œ. g. Fraseri (Fraser's).* *fl.* yellow, with obcordate petals, which are broad, and erosely undulated. June to October. *l.* ovate, glandularly denticulated. Stem simple at the base. *h.* 1ft. South Carolina, 1811. (B. M. 1674.)

Œ. grandiflora (large-flowered). *fl.* yellow; petals profoundly obcordate, distant, short. July. *l.* ovate-lanceolate, remotely toothed. *h.* 2ft. North America, 1778. Biennial. (B. M. 2068.)

Œnothera—*continued.*

Œ. Lindleyi (Lindley's). A synonym of *Œ. amœna.*

Œ. linearis (narrow).* *fl.* yellow, scarcely fragrant, corymbosely disposed on the tops of the branches. Summer. *l.* linear, or narrow-lanceolate, rather blunt, remotely toothed or entire, sometimes linear-oblong, tapering at the base, and slightly stalked. Stem slender, often branched. *h.* 10in. to 18in. United States.

FIG. 722. ŒNOTHERA EXIMIA, showing Habit and Longitudinal Section of detached Flower.

Œ. macrocarpa (large-fruited). A synonym of *Œ. missouriensis latifolia.*

Œ. marginata (margined). A synonym of *Œ. eximia.*

FIG. 723. FLOWERING BRANCH OF ŒNOTHERA MISSOURIENSIS LATIFOLIA.

Œ. missouriensis (Missouri). *fl.* yellow, large, with broadly obcordate petals; calyx spotted with red. June to August.

Œnothera—*continued.*

l. lanceolate, quite entire, or glandularly denticulated, with the margins and nerves covered with white silky down. Stem simple, prostrate, downy. United States, 1811. (B. M. 1592.)

Œ. m. latifolia (broad-leaved).* A fine form, with broader leaves than the type. See Fig. 723. (S. B. F. G. 5, under name of *Œ. macrocarpa.*)

Œ. odorata (fragrant). *fl.* at first yellow, becoming reddish as they fade, with deeply obcordate petals. April and May. *l.* lanceolate, a little toothed, undulately curled. Stems branched, suffruticose at the base. *h.* 1ft. to 2ft. Patagonia, 1790. Biennial.

Œ. o. virescens (greenish). *fl.* yellow; sepals unguiculate at back; petals obcordate, entire. June. *l.* linear-lanceolate, slightly toothed, undulately crisped. *h.* 2ft. South America, 1790. Biennial. (B. M. 2403, B. R. 147, and H. E. F. 183, under name of *Œ. odorata* β.)

Œ. odorata β (fragrant), of Sims. A synonym of *Œ. o. virescens.*

Œ. pallida (pale).* *fl.*, petals white, yellow at base, becoming reddish as they fade. June to September. *l.* linear-lanceolate, acuminated, quite entire or toothed, glabrous. Stems ascending, branched. *h.* 1½ft. North America, 1826. (B. R. 1142.)

Œ. pallida (pale), of Douglas. A synonym of *Œ. albicaulis.*

Œ. pumila (dwarf). *fl.* yellow, large. July. *l.* oblong-lanceolate, obtuse, sub-sessile, entire, yellow. Stem branched. *h.* 6in. North America, 1757. (B. M. 355.)

Œ. purpurea (purple). *fl.* purple; calyx tube short; petals broadly obovate, crenulate. June. *l.* lanceolate, attenuated at both ends. *h.* 1ft. North America, 1794. Annual. (B. M. 352.)

Œ. riparia (river-bank). *fl.* yellow, small, sub-spicate, on short pedicels, and with emarginate petals. Summer. *l.* lanceolate, denticulated. Stems erect, nearly glabrous. *h.* 2ft. to 3ft. North America.

Œ. Romanzovii (Romanzow's). *fl.* violaceous; petals broadly obovate, crenulate. Summer. *l.* lanceolate-oblong, mucronate, attenuated to the petioles. Stem erect, glaucous. *h.* 1ft. North America, 1817. (B. R. 562, under name of *Godetia Romanzovii.*)

Œ. rosea (rosy). *fl.* pink; petals somewhat round-obovate. June. *l.* ovate, attenuated at both ends, toothed; lower ones lyrate. *h.* 1ft. Mexico, &c., 1783. Half-hardy. (B. M. 347.)

FIG. 724. FLOWERING BRANCH OF ŒNOTHERA SPECIOSA.

Œ. speciosa (showy).* *fl.* white, becoming reddish as they fade, sub-racemose, with obcordate petals; raceme naked, at first drooping. March to September. *l.* oblong-lanceolate, attenuated at both ends, serrated and somewhat pinnatifid, pubescent beneath. Stem suffruticose. *h.* 2ft. to 3ft. North America, 1821. See Fig. 724.

Œnothera—*continued.*

Œ. taraxacifolia (Dandelion-leaved).* *fl.* white, becoming reddish as they fade, with large, obovate, entire petals, and a very long tube. Summer. *l.* pubescent, alternate, interruptedly pinnatifid, sinuately toothed, but the apex entire. Stem branched, elongated, procumbent. *h.* 6in. Chili, 1825. (S. B. F. G. 294.)

Œ. tenella (delicate). *fl.* purple. June. *l.* linear-spathulate. Stem branched, erect. *h.* 6in. to 9in. Chili, 1823. Plant rather glaucous. Annual. (B. M. 2424.) *G. tenuifolia* is very closely allied to this species.

Œ. triloba (three-lobed). *fl.* pale yellow, very fragrant in the evening; petals obovate, slightly three-lobed at the apex, the middle lobe mucronate. May to September. *l.* interruptedly pinnatifid, toothed. *h.* 3in. to 6in. North America, 1822. Annual. (B. M. 2566.)

Œ. vinosa (wine-stained). *fl.*, petals nearly white, with a slight dash of purple; calyx tube not more than one-third the length of the limb. July and August. *l.* linear-oblong, sub-dentate, glabrous. *h.* 2ft. California, 1835. Hardy annual. (B. R. 1880, under name of *Godetia vinosa.*)

Œ. Whitneyi (Whitney's).* *fl.* very numerous, crowded, 3in. to 4in. in diameter, rosy-red, blotched with crimson. Summer. *l.* oblong-lanceolate. *h.* 1ft. to 1½ft. California, 1870. Annual. SYN. *Godetia grandiflora* (B. R. 28, 51). (B. M. 5867.) There are several varieties of this fine species, including *concolor* (white), *flammea* (crimson), and *flammea striata* (crimson-striped).

Varieties. Of hardy annuals, few are more beautiful than than some of the garden varieties of *Œnothera*, which are much better known under the familiar name of *Godetia.* They are very attractive in mixed borders, especially if sown in masses, and are also most effective when grown in pots for greenhouse decoration. The following are amongst the best in cultivation:

Duchess of Albany. *fl.* of a beautiful satiny-white, sometimes 4in. across. Plant of pyramidal growth, very floriferous, and extra good.

FIG. 725. FLOWERING BRANCHES OF ŒNOTHERA LADY ALBEMARLE.

Lady Albemarle. *fl.* crimson, showy, and distinct. Plant dwarf and branching; very beautiful. See Fig. 725.

Lady Satin Rose. *fl.* beautiful rose. Habit similar to LADY ALBEMARLE. A brilliant-coloured and good variety.

Princess of Wales. *fl.* ruby-crimson. A good, rather old, variety, rather taller growing than either of the preceding.

The Bride. *fl.* white and carmine. Very free flowering and pretty.

ŒNOTHERÆ. A synonym of *Onagrariæ.*

OFFICINAL. Sold in shops.

OFFSETS. An Offset is a short, lateral shoot, bearing clustered leaves at the extremity, and capable of taking root when separated from the parent plant. The order *Crassulaceæ* affords several examples.

OFTIA (meaning unexplained by its author). SYN. *Spielmannia.* ORD. *Myoporineæ.* A genus comprising only a couple of species of greenhouse, evergreen shrubs, natives of South Africa. Flowers white, in the upper axils, sessile, or shortly pedicellate, ebracteate; calyx five-parted; corolla tube cylindrical; limb of five obovate, spreading lobes. Leaves alternate, or the lower ones opposite or almost whorled, sessile, serrulate, often rather small. The undermentioned species will thrive in any rich light soil. Young plants may be readily obtained by means of cuttings, inserted in sand, under a glass, in heat.

O. africana (African). *fl.* white, solitary, axillary; corolla salver-shaped, the segments marked with a blue streak at their base. February to November. *l.* ovate, acute, rigid, unequally serrate, with slightly pungent teeth; lower ones opposite; upper ones alternate. Branches succulent, opposite, rounded. *h.* 3ft. 1710. (B. M. 1899, under name of *Spielmannia africana.*)

OGECHEE LIME. *See* **Nyssa capitata.**

OHIGGINSIA. A synonym of **Hoffmannia** (which *see*).

OHLENDORFFIA (named in honour of Dr. C. F. Ohlendorff, of Holstein). SYN. *Chilostigma.* ORD. *Scrophularineæ.* A genus comprising nine species of small greenhouse shrubs, rarely herbs, depressed, prostrate or tufted, now regarded as a synonym of *Aptosimum*; one is a native of Nubia, and the rest are found in tropical Africa. Flowers sessile, axillary, bibracteolate; calyx deeply five-cleft, with narrow, sub-valvate lobes; corolla usually bluish, venose, with an enlarged throat, and a spreading, oblique, five-cleft limb; stamens four. Leaves alternate, clustered, entire, one-nerved, oblong-spathulate, linear, or acicular. *O. procumbens*, the only species known to cultivation, thrives in well-drained sandy peat. It is propagated by cuttings of half-ripened shoots, inserted in gentle heat; or by seeds.

O. procumbens (procumbent). *fl.* blue; corolla eight lines long, pubescent without, with a short narrow tube and a funnel-shaped limb. August. *l.* three to four lines long, not opposite, much crowded, petiolate, obovate, glabrous, rather thick, very obtuse, shortly mucronate. *h.* 2½ft. South Africa, 1836. Undershrub. (B. R. 1882, under name of *Aptosimum depressum.*)

OIDES. *See* **Odes.**

OIDIUM. A name given to many of the minute Fungi included under the name Mildew, at a time when they were regarded as distinct and good species, without regard to the forms which, it is now known, they assume when fully mature. *See* **Mildew.** In the *Oidium* stage, the Fungus consists of a white coating over all parts of the infested plants. Under the microscope, this is seen to consist of a tangled network of nearly transparent filaments, made up of cells joined end to end. Most of the filaments creep on the surface of leaves, or stems, of the host-plants, pushing fine-lobed branches into the cells of the latter, to suck food from them; while erect filaments stand up over the surface of the Fungus. Each filament is made up of a row of cells, and those at its tip, after a time, break off, and fall away from the lower part, as reproductive bodies (conidia); these in some Fungi are globular, in others barrel-shaped, or nearly cylindrical. But many of the Fungi formerly placed in the group called *Oidium*, when traced to their full development, are found to form reproductive bodies (spores) in asci, which are inclosed in a case, or perithecium, formed of brown cells, closely joined side by side. Frequently, many perithecia are formed on a patch of the Fungus resembling grains of

Oidium—*continued.*

gunpowder strewn over the white or pale grey surface. The perithecia usually bear, on their outer surface, simple or forked hairs or prickles, the differences in which help in distinguishing the species and genera of the group. The number of asci in each perithecium, and the number of spores in each ascus, differ considerably in the various genera. There are many different kinds of *Oidium*, but all have a characteristic appearance, that enables an expert to recognise a member of the group, on seeing the affected plant. Several of the species are met with on uncultivated plants, others on cultivated ones; frequently, they injure the latter very much, *e.g.*, *Erysiphe graminis*, on grass-leaves, as whitish spots on leaves and stems of grasses; *E. Martii*, on Peas; and so forth. In some species, *e.g.*, *E. graminis*, the perithecia are formed only under very favourable circumstances; hence they are much better known as *Oidium* than in the perfect state. This leads to a few species, the *Oidium* of which is, at times, very plentiful and harmful, while their perithecia remain unknown. In this latter group may be noticed that found on Turnips, in various parts of England, and also in Scotland, caused by an *Oidium* (*O. Balsamii*); and the widely-known disease of the Grape Vine, characterised by the formation of white patches on leaves and Grapes, these patches belonging to a Fungus only too famous as *Oidium Tuckeri*.

The various *Oidia* prove hurtful by absorbing the protoplasm from the cells of their hosts, by means of the small lobed branchlets pushed into the tissues of the latter. The result of this is to cause the parts attacked to become yellow and faded, and, after a time, death of the part, or of the whole plant, ensues. The Vines in many Vine-producing countries were exceedingly injured by *O. Tuckeri*; the Hops in England, and elsewhere, are often seriously damaged by *Sphærotheca Castagnei*; and many other plants suffer, in greater or less degree, from attacks of other species of this group.

Remedy. The superficial position of the Fungi renders direct treatment easy. A thorough application to the diseased parts of the host-plants of flowers of sulphur, or of potassium sulphide in weak solution, is found sufficient to put an end to the growth of the Fungus, without injuring the host. The solution has been recently found most useful in the removal of Green Fly and Red Spider, as well as of Mildew.

OIL NUT. A West Indian name for the seeds of *Ricinus communis*.

OIL PALM. *See* **Elaëis.**

OLACINEÆ. An order of erect, climbing, or twining shrubs or trees, very rarely suffruticose or sub-herbaceous, dispersed over the tropical and sub-tropical regions of the globe, a few growing in South Africa or extra-tropical Australia. Flowers greenish, yellowish, or white, rarely purplish, generally small; calyx four or five (rarely six) toothed, lobed, or parted; petals four, five, or rarely six, free, or coalescing in a campanulate or tubular corolla; inflorescence cymose, racemose, or paniculate. Fruit usually drupaceous, one-seeded. Leaves alternate, or rarely opposite, entire or occasionally toothed, often penninerved; petioles usually flexuous; stipules none. The order includes thirty-six genera and about 170 species. Examples: *Heisteria*, *Icacina*, and *Olax*.

OLAX (from *olax*, a furrow; flowers partially furrowed or imbricated). SYNS. *Fissilia*, *Lopadocalyx*, *Spermaxyrum*. ORD. *Olacineæ*. A genus of about twenty-two species of stove, often climbing, glabrous trees, shrubs, or sub-shrubs; eight are found in Australia, ten in tropical Asia, and four are indigenous to tropical Africa or Madagascar. Flowers small, disposed in short axillary spikes or racemes, rarely solitary. Leaves alternate, often distichous, entire, articulated with the branches. The undermentioned species, probably the only

Olax—*continued.*

ones known to cultivation, thrive in a compost of sandy peat, fibry loam, and a little dried leaf mould. Propagated by cuttings of ripened shoots, inserted in sand, under a bell glass, in heat.

O. imbricata (imbricated). *fl.* white; racemes axillary, imbricated. December. *fr.* ovate. *l.* oblong, or oblong-lanceolate, bifarious, entire, shining. East Indies, 1820. Climbing shrub.

O. scandens (climbing). *fl.* white, racemose; petals six. December. *l.* pubescent beneath. Stem prickly; branches terete, climbing. Coromandel, 1820. Shrub.

O. stricta (upright). *fl.* white, abortive. *l.* oblong-linear, mucronate. Australia, 1820. Erect glabrous shrub. SYN. *Spermaxyrum strictum*.

OLDENLANDIA (named after Henry Bernh. Oldenland, a Dane, who collected plants at the Cape of Good Hope). ORD. *Rubiaceæ*. An extensive genus (about seventy species) of stove or greenhouse, slender, erect or diffuse herbs, sometimes shrubby at base; they abound in tropical and sub-tropical regions, being mostly found in Asia. Flowers white or pink, small, in axillary or terminal panicles, or rarely solitary. Leaves opposite, narrow, frequently small. The species have no horticultural interest.

OLDFIELDIA (named after R. A. Oldfield, a merchant at Sierra Leone). ORD. *Euphorbiaceæ*. A monotypic genus, the species being a stove evergreen tree. It thrives in a mixture of loam, leaf mould, and sand, and requires an abundance of water when in rapid growth. Propagated by cuttings.

O. africana (African). *fl.*, males loosely cymulose, the small cymes axillary, on peduncles shorter than the petioles; female flowers unknown. *l.* opposite, long-stalked, digitately five to seven-foliolate; leaflets petiolulate, entire, coriaceous, penni-veined. Tropical Western Africa. The timber of this tree is believed to be the African oak or teak.

OLD MAN. A common name applied to *Artemisia Abrotanum* and *Rosmarinus officinalis*.

OLD MAN'S BEARD. *See* **Clematis Vitalba** and **Saxifraga sarmentosa.**

OLEA (the old Latin name, akin to the Greek *Elaia*, the Olive). Olive. ORD. *Oleaceæ*. A rather large genus (about thirty-five species) of usually greenhouse evergreen trees, natives of tropical and central Asia, the Mediterranean region, tropical and South Africa, the Mascarene Islands, and New Zealand. Flowers white, in axillary and terminal panicles, small; corolla funnel-shaped, with a short tube; inflorescence mostly or almost totally centripetal. Drupe ovoid, oblong, or globose. Leaves opposite, entire or rarely toothed. The species here described are those best known to cultivation. Oleas thrive in well-drained loam, and are of the easiest cultivation. They are propagated by cuttings of the ripened young shoots, or by seeds.

O. capensis (Cape). *fl.* disposed in racemose terminal panicles, June. *fr.* rather wrinkled, size of a pea. *l.* oblong, coriaceous, dense and rigid, decussate, always paler beneath. Branches rather tetragonal, from decurrent lines. *h.* 5ft. Cape of Good Hope, 1730. (B. R. 613.)

O. europæa (European). Wild Olive. *fl.* panicled. June to August. *fr.* small, of no value. *l.* oblong, mucronate, quite entire, shorter and stiffer than those of the cultivated Olive, hoary beneath while young. Branches rather quadrangular, hoary. South Europe, &c., 1821. This small tree is nearly hardy. SYN. *O. Oleaster*.

O. e. sativa (cultivated). *fl.* small, panicled. August. *l.* lanceolate, mucronate, quite hoary beneath. Branches angular, but not spinescent. South Europe, 1570. SYN. *O. sativa*.

O. fragrans (fragrant). A synonym of *Osmanthus fragrans*.

O. ilicifolia (Holly-leaved). A synonym of *Osmanthus Aquifolium*.

O. laurifolia (Laurel-leaved). *fl.* disposed in terminal, loosely trichotomous panicles. Summer. *fr.* sub-globose. *l.* oblong, acuminate at both ends, more or less undulated, or flat, entire, glabrous, petiolate; petioles ½in. long. Cape of Good Hope. (B. M. 3089 and L. B. C. 379, under name of *O. undulata*.)

O. Oleaster (Oleaster). A synonym of *O. europæa*.

O. sativa (cultivated). A synonym of *O. europæa sativa*.

O. undulata (wavy). A synonym of *O. laurifolia*.

Olea—*continued.*

O. verrucosa (warted). *fl.* in axillary panicles, scarcely shorter than the leaves. April. *fr.* sub-globose. *l.* linear-lanceolate, sub-sessile, attenuated at both ends, callous-apiculate, entire, glabrous above, scaly beneath. Cape of Good Hope, 1814.

OLEACEÆ. An order of erect or climbing shrubs or trees, inhabiting the temperate and warmer regions of the globe. Flowers hermaphrodite, rarely dicœcious or polygamous, regular; calyx campanulate, four or many-toothed or lobed, rarely none; corolla gamopetalous, salver or funnel-shaped, or campanulate; lobes or petals four, rarely five or six, sometimes absent; inflorescence sometimes centrifugal, dichotomously cymose, sometimes trichotomously paniculate, mostly or totally centripetal, or the branchlets ultimately centrifugal-cymose; panicles, or cymes, loose, or in contracted fascicles, axillary or terminal. Fruit indehiscent, or a loculicidal capsule, a berry, or a drupe. Leaves opposite, rarely alternate or whorled, simple or pinnately three or few-foliolate, entire or toothed; stipules none. Olive oil is expressed from the pericarp of the drupe of *Olea europæa*, and the unripe drupe, macerated in brine, is eaten. Ash-wood (*Fraxinus*) is invaluable for its lightness, flexibility, and strength; and a sugary juice, Manna, is produced by *F. Ornus* and some other species; while the bark of the common Ash (*F. excelsior*) has been proposed as a substitute for quinine. The order contains eighteen genera and about 280 species. Illustrative genera are: *Fraxinus*, *Jasminum*, *Olea*, and *Syringa*.

OLEANDER. *See* **Nerium Oleander.**

OLEANDRA (from *Oleander*, which plant *O. neriiformis* is thought to resemble). ORD. *Filices.* A small genus (about half-a-dozen species) of stove Ferns, almost restricted to the tropics. They are distinguished from *Nephrodium* mainly in habit, with wide-creeping, scandent shoots, jointed stems, and entire, lanceolate-elliptical fronds. Sori round, inserted in a row near the base, or below the centre of the compact, free veinlets; involucre reniform. The species in cultivation may be used for pillar plants. A wire cylinder should be made around the pillar, and filled up with fibrous peat and sphagnum. The creeping rhizomes should then be laid over the surface, and fastened by means of small wire or wooden pegs. Large pots or pans may also be utilised, on which to build fibry peat in the shape of a cone or ball, covering the surface with rhizomes in the same way. Thus treated, specimens of almost any size may be, in course of time, obtained. For general culture, *see* **Ferns.**

O. articulata (jointed).* *shoots* firm, sub-erect, wide-climbing, scaly. *sti.* scattered, sometimes opposite, but not whorled, 1in. to 2in. long, with the joint close to the base. *fronds* 6in. to 12in. long, 1½in. to 2in. broad. *sori* in two irregular rows, often some distance from the midrib. Natal, Mascarene Islands, &c. A fine, evergreen species.

O. hirtella (slightly hairy). A form of *O. neriiformis.*

O. musæfolia (Musa-leaved). *shoots* firm, wide-climbing, clothed with adpressed scales. *sti.* ½in. to 1in. long, jointed close to the base. *fronds* 6in. to 12in. long, 1in. to 1½in. broad, narrowed gradually towards both ends. *sori* in two irregular rows near the midrib; involucre oblique. Ceylon and Malayan Islands.

O. neriiformis (Oleander-like).* *shoots* woody, sub-erect, scaly. *sti.* ½in. to 1in. long, with the joint just below the middle. *fronds* 6in. to 18in. long, ¾in. to 1½in. broad, scattered or in opposite pairs, or often in terminal whorls, narrowed gradually towards both ends. *sori* in two rather irregular rows, near the midrib; involucre oblique. Tropics. A very handsome species, of which *O. hirtella* is merely a form.

O. nodosa (knotty).* *shoots* trailing horizontally, densely clothed with linear-subulate, spreading scales. *sti.* scattered, 2in. to 6in. long, often ebeneous, articulated not far from the base. *fronds* 6in. to 12in. long, 1½in. to 2½in. broad, the apex acuminate, the edge entire. *sori* scattered, placed nearly all in the inner half of the frond; involucre one-third of a line broad. West Indies, &c. A beautiful, free-growing species, distinguished from all the others by its trailing shoots, satiny gloss, and copious, irregularly-scattered sori.

Oleandra—*continued.*

O. Wallichii (Wallich's). *shoots* trailing horizontally; scales spreading, ferruginous. *sti.* close or scattered, ½in. to 2in. long, jointed close to the base. *fronds* 6in. to 12in. long, ¾in. to 1½in. broad, the apex acuminate; rachis naked or scaly. *sori* in single rows close to the midrib; involucre ciliated. North India (up to 7000ft. altitude).

OLEARIA (from *Olea*, an Olive-tree; in allusion to the resemblance to that tree existing in some of the species). SYN. *Eurybia.* ORD. *Compositæ.* A large genus of greenhouse or hardy shrubs, sometimes arborescent, sub-shrubs, or rarely branched herbs. Eighty-five species have been described; of these, sixty-three are Australian, and the rest natives of New Zealand and the adjacent islands. Flower-heads rather large, mediocre or small, solitary, corymbose or paniculate; ray-florets white or blue; disk yellow, or rarely bluish-purple; involucre ovoid, campanulate, or sub-hemispherical; receptacle flat or slightly convex, foveolate. Leaves alternate or rarely opposite, penniveined or one-nerved, entire or dentate. Olearias make excellent plants for the cool conservatory—where they thrive best when planted out—or for clothing dwarf walls, &c. Some of them—*O. Haastii*, for instance—make beautiful bushes in the open shrubbery border, and are quite hardy in most places. The species are readily propagated by means of half-ripened young shoots, inserted in sandy soil, under a bell glass, and shaded. They succeed in almost any soil. Probably the species here described are the only ones yet introduced.

O. dentata (toothed).* *fl.-heads* rosy-white, about 1¼in. in diameter, in terminal, erect or spreading corymbs. Spring. *l.* petioled, very variable, 1½in. to 2in. long, elliptic-ovate or cordate-ovate, obtuse, crenated. Australia. Nearly hardy shrub, with branches, leaves (beneath), and inflorescence densely tomentose. (B. M. 5973.)

O. Forsteri (Forster's). *fl.-heads* white, fascicled, and sessile on the branches of the panicle; corymbs longer than the leaves, many-headed. Summer. *l.* 2in. to 3in. long, oblong, obtuse; margins undulated; both surfaces reticulated, lower white with down; petioles ½in. to 1in. long. New Zealand, 1866. A small, hardy tree.

O. furfuracea (scurfy). *fl.-heads* ½in. in diameter, numerous, in large, branched, loose, spreading corymbs. *l.* 1½in. to 2½in. broad, ovate-oblong, obtuse, waved, rarely sinuate-toothed, rounded and unequal at base, reticulated above; petioles ¼in. to 1in. long. Branches terete, velvety. *h.* 10ft. to 15ft. New Zealand. Hardy tree.

FIG. 726. OLEARIA GUNNIANA, showing Flowering Branch; (1) Branchlet, and (2) Flower-head.

O. Gunniana (Gunn's).* *fl.-heads* white, borne in great profusion, about ¾in. in diameter. September. *l.* oblanceolate, coarsely toothed, and hoary on the under surface. Branches hoary. *h.* 5ft.

Olearia—*continued.*

to 5ft. Tasmania. A very handsome shrub; hardy if afforded some protection in winter. SYN. *Eurybia Gunniana.* See Fig. 726. (G. C. n. s., xvii. 733.)

O. Haastii (Haast's).* *fl.-heads* white, numerous, shortly pedicellate, in lax or dense, sub-terminal, corymbose, hoary cymes; peduncles usually much longer than the leaves. August. *l.* crowded, ¾in. to 1in. long, elliptic or ovate-oblong, obtuse or sub-acute, white beneath. Branches woody, thick, the ultimate ones hoary. New Zealand. Hardy shrub. (B. M. 6592.)

O. ramulosa (slightly-branched). *fl.-heads* whitish, small, very numerous, usually sessile, or terminating very short peduncles or branchlets. Autumn. *l.* crowded, usually very small and spreading, sometimes reflexed and clustered in the axils, one to six lines long. *h.* 3ft. to 6ft. Australia. A much-branched shrub.

OLEASTER. *See* **Elæagnus.**

OLERACEOUS. Esculent; suitable for culinary use.

OLFERSIA. Included under **Acrostichum** (which *see*).

OLIBANUM-TREE. *See* **Boswellia.**

OLIGOCARPHA. A synonym of **Brachylæna** (which *see*).

OLIGOSCIAS. Included under **Panax** (which *see*).

OLIGOSMA. A synonym of **Nothoscordum** (which *see*).

OLIVACEOUS. Greenish-brown.

OLIVE. The original home of the Olive is, probably, Asia Minor and Greece, but it is now abundantly naturalised in many countries, notably in the Mediterranean region. "The Olive is one of the most characteristic and beautiful features of all Southern scenery. On the slopes of the Northern Apennines, Olives are the usual forest timber; the whole of the Val d'Arno is wooded with them, every one of its gardens is filled with them, and they grow, in orchard-like ranks, out of its fields of maize, or corn, or vine, so that it is physically impossible, in most parts of the neighbourhood of Florence, Pistoja, Lucca, or Pisa, to choose any site of landscape which shall not owe its leading character to the foliage of these trees. What the Elm and Oak are to England, the Olive is to Italy. . . . . And here I challenge the untravelled English reader to tell me what an Olive-tree is like? I know he cannot answer my challenge. . . . . Now, the main characteristics of an Olive, tree are these: It has sharp and slender leaves, of a greyish-green, nearly grey on the under surface, and resembling, but somewhat smaller than, those of our common Willow. Its fruit, when ripe, is black and lustrous; but, of course, so small that, unless in great quantity, it is not conspicuous on the tree. Its trunk and branches are particularly fantastic in their twisting, showing their fibres at every turn; and the trunk is often hollow, and even rent into many divisions, like separated stems; but the extremities are exquisitely graceful, especially in the setting-on of the leaves; and the notable and characteristic effect of the tree in the distance is of a rounded and soft mass, or ball, of downy foliage" (Ruskin, "Stones of Venice").

The Olive has been cultivated from time immemorial for the sake of the oil, obtained by pressure from the pulp of its fruit. In some countries, this oil forms an important article of food, besides being extensively used in cooking other articles; but in this country its principal use is in salads, &c. Olives for pickling consist of the unripe fruits deprived of a portion of their bitterness by being soaked in water, to which lime and wood ashes are sometimes added; they are then bottled in salt and water, and flavoured with aromatics. Olive branches have for ages been regarded as emblems of peace and plenty.

A large number of varieties are cultivated, and these are propagated by grafting on the Wild Olive stock. *See also* **Olea.**

OLIVE-BARK TREE. *See* **Terminalia Catappa.**

OLIVERIANA. Included under **Trichopilia** (which *see*).

OLIVE, WILD. *See* **Elæagnus** and **Olea europæa.**

OLIVE-WOOD. *See* **Elæodendron.**

OMALANTHUS. A synonym of **Homalanthus** (which *see*).

OMENTARIA. A synonym of **Tulbaghia** (which *see*).

OMPHALANDRIA. A synonym of **Omphalea** (which *see*).

OMPHALEA (from *omphalos*, the navel; alluding to the umbilicated anthers). SYNS. *Duchola, Hebecocca, Hecatea, Omphalandria, Ronnowia.* ORD. *Euphorbiaceæ.* A genus comprising eight species of stove, climbing or twining shrubs, rarely diffuse trees; one is a native of Madagascar, and the rest are tropical American. Flowers cymulose, monœcious, apetalous; cymes composed wholly of male flowers, or with one female in the centre, and disposed in terminal panicles. Fruit thick, fleshy externally. Leaves alternate, often large, entire, penniveined, and often three to five-nerved at base; petioles biglandulose at apex. *O. triandra*, the only species yet introduced, thrives in a mixture of peat and loam. Propagated by cuttings, inserted in sand, under a glass, in heat.

O. triandra (three-anthered). *fl.* with three anthers. *fr.* yellow, globose, furrowed, 1½in. in diameter. *l.* oblong, oval, or cordate, glabrous. *h.* 12ft. Jamaica, &c., 1763. Diffuse tree. A juice is extracted from this species, which turns black in drying, and is said to be used in making ink, or as glue; the nuts, after the poisonous embryo is extracted, are edible. (L. B. C. 519.)

OMPHALOBIUM. A synonym of **Connarus** (which *see*).

OMPHALOCOCCA. A synonym of **Ægiphila** (which *see*).

OMPHALODES (from *omphalos*, the navel, and *eidos*, resemblance; referring to the shape of the seed). SYN. *Picotia.* ORD. *Boragineæ.* A genus of very ornamental, hardy, annual or perennial herbs, distinguished from allied genera in having the four nut-like seeds furnished with an inflexed margin, which renders them cup-shaped. There are about ten species, natives of Europe, North Africa, Western and Central Asia,

FIG. 727. UPPER PORTION OF PLANT OF OMPHALODES VERNA.

and Japan. Flowers white or bluish, on slender pedicels, rarely all axillary; racemes loose, ebracteate, or with leafy bracts at base. Radical leaves long-stalked, lanceolate, ovate, or cordate; stem ones few, alternate. The four species in our gardens are of easy culture in any moderately good soil; they are very suitable for naturalising in woods and shrubberies, where the head-growth is not too dense. Propagated freely by divisions, in the spring; or by seeds, sown at the same season.

O. linifolia (Flax-leaved). Venus's Navelwort. *fl.* white, rarely with a tinge of blue, in bractless racemes. June to August. *l.*, radical ones cuneiform; stem ones linear-lanceolate, glabrous,

Omphalodes —*continued.*

with denticulated, ciliated margins. Branches terminating in loose racemes. *h.* 6in. to 12in. South Europe &c., 1748 Annual.

O. Luciliæ (Lucilia's).* *fl.* lilac-blue, nearly ½in. in diameter, much larger than those of *O. verna*. Summer. *l.* oblong-obtuse, radical ones narrowed into a long footstalk; cauline ones sessile, and the upper ovate. *h.* 4in. to 6in. Mountains of Greece and Asia Minor, 1873. A handsome perennial rock plant. (B. M. 6047.)

O. nitida (shining). *fl.* white; racemes very long, ebracteate; pedicels and calyces adpressedly pilose. May. *l.* oblong-lanceolate, nerved, glabrous and shining above, pubescent beneath; lower ones long-stalked; upper ones sessile. Stem erect, branched, glabrous. *h.* 2ft. Portugal, 1812. Perennial. (B. M. 2529.)

O. verna (spring).* *fl.* blue, with a white throat, distant, on long pedicels; racemes bractless, conjugate, few-flowered. March to May. *l.*, radical ones ovate-cordate; cauline ones ovate-lanceolate, petiolate. *h.* 6in. South Europe, &c., 1633. A well-known and extremely pretty perennial, which, when fairly established, makes rapid growth, increasing itself by runners, somewhat like Strawberry plants. See Fig. 727. (B. M. 7, under name of *Cynoglossum Omphalodes.*)

ONAGRARIEÆ. An order of inodorous, annual or perennial herbs, rarely shrubs or trees, a few being aquatic. They are found in all temperate regions, but are rare in the tropics. Flowers generally hermaphrodite, usually axillary and solitary, or else spicate or racemose at the tips of the branchlets, rarely paniculate; calyx tube adnate to the ovary; lobes two or four, rarely five or six, valvate; petals often two or four (rarely none), inserted at the base of the disk, fugacious, twisted. Fruit capsular, nut or berry-like. Leaves opposite and alternate, membranous, entire or rarely pinnatifid, sometimes toothed or serrated; stipules none. The species contain mucous and, occasionally, somewhat astringent principles. The berries, as a rule, are sweet and edible; while the roots of several species of *Œnothera* are also eaten. The order comprises twenty-two genera and about 300 species. Illustrative genera are: *Fuchsia, Gaura, Œnothera,* and *Trapa.*

ONCIDIUM (from *onkos,* a tumour; referring to the warty crest on the base of the labellum). ORD. *Orchideæ.* A large genus of epiphytal Orchids, inhabiting tropical America and the West Indies. Over 250 species have been described, and a large proportion of these have been, or are still, cultivated in English collections; whilst additions are being frequently made, both to the number of species and to those in cultivation. The flowers show remarkable variety, both as regards size, form, and colour; in the latter, yellow predominates. They are borne either in long, flexuose racemes, or in dense, clustering spikes, a few being distinguished by one-flowered scapes; peduncles from the base of the matured pseudo-bulbs generally accompany the new growth. Leaves variable in size and form, often thick and leathery, sometimes thin and papery. Pseudo-bulbs generally compressed laterally, ovate-oblong, rotundate, or cylindrical; in a few species almost or entirely suppressed.

From an altitude of 12,000ft. or 14,000ft., where snow and frost are frequent, and where, at all times, the atmosphere is cool, and laden with moisture, several of our popular garden Oncidiums are obtained; and from this extreme elevation, down to the hot, moist valleys of the most tropical parts of America, the species are found luxuriating under very varied conditions. Some of them grow well only when kept in bright sunlight and a tropical temperature, whilst others require shade, with a medium amount of heat and moisture; others, again, thrive only when kept quite cool and moist, and placed out of the reach of direct sunshine.

The wide range of distribution over which the Oncidiums extend, and the often wide difference in the conditions under which they grow in a state of nature, suggest that, for their cultivation here, houses of both tropical and intermediate, as well as cool, temperatures are necessary, if a representative collection is to be

Oncidium—*continued.*

grown. Taking, first, the tropical species, of which *O. Cavendishianum, O. Lanceanum,* and *O. Papilio* may be cited as examples, it will be found that, to grow these well, a moist stove is necessary, and that, during the season when growth is most vigorous, the conditions requisite in the case of East Indian Orchids must be maintained for these tropical Oncidiums. During winter, the temperature may be lowered to that of an intermediate house, viz., from 55deg. to 60deg. in the day, and 50deg. at night, and the moisture in the air and at the root be reduced to a minimum. The large-leaved, strong-growing species are best managed when planted in baskets or pots, with a good quantity of peat, sphagnum, and charcoal about their roots; whilst the smaller kinds may be fastened on to rafts or blocks, and suspended near the glass. These last must be watched during warm weather, and prevented from becoming parched; a dip in a pail of water once or twice a day being good for them, even when growing in a house where a continual, moist atmosphere is maintained.

The species requiring what is termed an intermediate house, such as is usually provided for Cattleyas, or even where shrubby Begonias are grown, may be treated as advised for the above as regards moisture, light, potting or rafts, and rest. A considerable number of Oncidiums belong to this intermediate section, some of the most familiar of them being *O. crispum, O. Jonesianum, O. macranthum, O. Marshallianum, O. serratum, O. varicosum,* &c. Probably, the most beautiful of the Oncidiums are to be found in this group, and if a collection of them were selected from those enumerated below, the wonderful form and exquisite beauty of their flowers would be a source of much greater delight than is generally understood to belong to the genus. The distinct and handsome *O. Jonesianum* is somewhat exceptional in its requirements, as it makes its growth during our autumn and winter, and should be kept as cool and dry as possible from April to September, the period when almost all the other kinds are growing vigorously.

Of the really cool species, there are yet many of remarkable beauty and distinctness. As they may be grown in a house or pit, from which in winter frost alone is excluded, and in summer the temperature kept cool, and the air as fresh and moist as possible, they may be enjoyed by those who do not care to provide heated structures for Orchids. Some of them—for instance, *O. cucullatum* and its forms—are found at very high elevations, where frost is frequent; and *O. æmulum* is equally cool in its native haunts. They require plenty of moisture, both at the root and in the air about them, all the year round; and generally, they succeed best when planted in pots, using for this purpose a mixture of peat, sphagnum, and charcoal.

Propagation is effected by division of the plants. A few of the species which produce long flower-racemes develop young plants in the axils of the branches of these, as in the genera *Epidendrum* and *Phalænopsis.*

In the following list of species, those marked T. are tropical, and require stove treatment; while those marked C. will thrive in a cool house. The remaining species require an intermediate temperature.

O. acinaceum (scimitar-shaped). *fl.* about 1in. across; sepals white; petals large, violet, bordered with white; lip the same colour, shaded with carmine; spikes from 1ft. to 2ft. long. Peru, 1866. A distinct and elegant species.

O. æmulum (rivalling).* *fl.* very large; dorsal sepal of a warm cinnamon colour, nearly reniform in shape; lateral sepals longer, of a yellowish-brown or cinnamon colour; petals very bright cinnamon, all the segments nicely crisped or wavy: lip marked with purple-violet, yellow at its base, with reddish-brown streaks. Peru, &c., 1872. A vigorous-growing species, a worthy rival to *O. macranthum.* (B. M. 5980.)[C.]

O. alcicorne (stag's-horn). *fl.* yellow, with pallid streaks, panicled. *l.* ligulate. Pseudo-bulbs oblong, ancipitous. New Grenada, 1872.

Oncidium—*continued.*

O. altissimum (tallest). *fl.* yellow; sepals and petals five, lanceolate, longer than the lip; scape panicled. August. West Indies, 1793. (B. M. 2990; B. R. 1851.) [C.]

O. altissimum (tallest), of Lindley. A synonym of *O. Baueri.*

O. ampliatum (broad-lipped).* *fl.* clear yellow, much paler on the under side; panicle ample, much branched, on a scape about 3ft. in height. Spring and early summer. *l.* solitary, large, thick, and fleshy in texture, of a bright shining green on the upper side, paler below. Pseudo-bulbs large, compressed, apple-green, streaked and spotted with reddish-brown. West Indies and Central America, 1832. This is one of the finest large-growing species of *Oncidium* in cultivation; it should be grown in a pot, and never be allowed to shrivel during the resting seasons. (B. R. 1699.) This is an excellent variety of this, *majus.* [T.]

O. andigenum (Andine). *fl.* yellow, densely covered with small purple dots; column purple, crest of the lip deep golden-yellow; spike erect, from five to seven-flowered. Ecuador, 1869. A very choice species, with the habit of *O. cucullatum.* [C.]

O. annulare (ringed).* *fl.* rich chestnut-brown; sepals with an exceedingly narrow yellow border; petals of the same shade of brown, but with a broad, shining apex and broader border of a very beautiful deep yellow, very wavy (they are coherent at their top, as if glued together, and thus form a ring); lip brown, with a yellow top, the crest with light yellow teeth, two lateral brown disks, yellow centre, and three purplish-violet small teeth before the apex. Summer. 1875. A grand species, closely resembling *O. macranthum* in pseudo-bulb, leaf, inflorescence, and general habit.

O. ascendens (ascending). *fl.* yellow, with red in the region of the crest, and in the form of stains on the sepals and petals; characteristic on account of the incurved column-wings. Mexico and Central America, 1837.

O. aurarium (golden). *fl.* of a fine yellow, spotted with brown; side lobes of lip rectangular; middle lobe triangular, light yellow, with a reddish-brown disk at base, over which are five light sulphur keels, ending in bristles; panicle 4ft. to 5ft. high, with numerous zigzag twigs. *l.* two, ligulate, acute. Pseudo-bulbs compressed, pear-shaped, ribbed, nearly 9in. high. Bolivia, 1884.

O. Balderiamæ (Balderrama's). A synonym of *O. Balderramæ.*

O. Balderramæ (Balderrama's). *fl.* light olive-yellowish-brown; upper sepal rather round, with a very narrow, light yellow border; side sepals unicoloured; petals curved, nearly complicate, crisp, with a yellow border; lip blunt. Summer. Columbia, 1872. Allied to *O. metallicum.* SYN. *O. Balderiamæ.*

O. barbatum (bearded).* *fl.* from 1¼in. to 2in. across, but very variable in size; sepals lanceolate, with wavy margins of a pale yellow colour, barred with warm chestnut-brown; lateral sepals connate for half their length; petals oblong, with wavy margins of a clear golden colour, streaked with crimson-brown at the base only; lip triangular, lateral lobes clear golden-yellow, margins of the discal portion fimbriate, and spotted with brown, apical lobe rhombiform and clear yellow; spike from 1ft. to 3ft. long. Summer. Pseudo-bulbs roundish, ovoid, with a well-defined ridge up the centre, one-leaved. Guatemala to tropical America, 1818. (L. C. B. 27.) A very distinct and variable species, some of the varieties having their petals lanceolate, and barred with brown, like the sepals. [T.]

O. b. ciliatum (fringed-lipped). *fl.*, sepals and petals yellow, blotched with red; lip yellow, with fringed plates. Winter. Brazil, 1818. A pretty, compact plant, seldom growing more than 6in. high. (B. R. 1660, under name of *O. ciliatum.*) [T.]

O. Barkeri (Barker's). A synonym of *O. tigrinum.*

O. Batemannianum (Bateman's). *fl.* bright yellow. Mexico, 1838. A very distinct and good species, about 1½ft. high, and with pale green foliage; does not, however, blossom freely. There are several desirable varieties. [C.]

O. B. ramosum (branched). *fl.* brilliant yellow, disposed in a very large panicle; sepals and petals banded with rich chocolate. Brazil. [C.]

O. B. spilopterum (spotted-winged). *fl.* racemose; sepals and petals green outside, red inside; middle front tooth of the crest much larger than the others. Brazil, 1844. (B. R. 1845, 40, under name of *O. spilopterum.*) [C.]

O. Baueri (Bauer's). A species often mistaken for *O. altissimum,* from which it differs in its scape being panicled from the very base, in its longer pseudo-bulbs, and in its sharply truncated column-wings. West Indies, &c. (B. R. 1651, under name of *O. altissimum.*)

O. bicallosum (two-warted).* *fl.*, sepals and petals dark brown; lip bright yellow; spike erect, many-flowered. Winter. *l.* solitary, dark green, thick, fleshy. Guatemala, 1842. A showy, dwarf-growing species. (B. M. 4148.) [T.]

O. bifolium (two-leaved).* *fl.*, sepals and petals greenish-brown, tinged with yellow; lip large, measuring sometimes as much as 1½in. across, bilobed in front, and wholly rich golden-yellow in colour; racemes loose, about 1ft. long. Winter. *l.* oblong, often tinged with bronze. Pseudo-bulbs brownish, fluted, 1in. to 2in. high. Monte Video, 1811. (B. M. 1491.) A handsome, free-flowering, dwarf-growing species. The variety *majus* is, however, now most esteemed in cultivation; it differs from the type only in its larger size and handsome flowers. [T.]

Oncidium—*continued.*

O. bifrons (two-faced). A synonym of *O. Warscewiczii.*

O. brachyandrum (short-anthered). *fl.*, sepals and petals cinnamon colour; lip yellow; peduncles slender, one or two-flowered. *l.* grassy, ligulate. Pseudo-bulbs oblong, flattened. South Mexico, 1871. A delicate little species.

O. Brunleesianum (Brunlees'). *fl.*, sepals and petals greenish-yellow, brownish towards their lips, the petals striped with brown, the lateral sepals connate and bidentate; lip broad, trifid; side lobes erect, yellow; front lobe purple-brown; callus of two straight, parallel keels, a few small tubercles between them, and two before them, yellow on white, with red bars. 1883. A pretty species.

O. bryolophytum (moss-plumed). *fl.* golden, standing singly among a moss-like mass of greenish, stellate, abortive flowers (whence the specific name); panicles elongated. Pseudo-bulbs pyriform, flattened. Central America, 1871.

O. calanthum (beautiful-flowered).* *fl.*, sepals and petals light yellow, somewhat oblong, nearly as long as the lip; lip broad, deep yellow, the crest of the lip and column being stained with red; spike long, many-flowered. Ecuador, 1870. A pretty and distinct, free-flowering species. (F. M. 384.)

O. Carderi (Carder's).* *fl.* light coffee colour, with the petals half white, the superior part of the lip yellow, and the anterior pink, disposed in large panicles, equalling those of *O. æmulum. l.* linear-lanceolate, acute. Pseudo-bulbs oblong-ligulate, compressed. Columbia, 1875. A showy plant. [C.]

O. carthaginense (Carthagenian). *fl.*, sepals and petals five, obovate-unguiculate, a little shorter than the lip; scape panicled. Summer. *h.* 4ft. West Indies, 1791. [T.]

O. c. sanguineum (bloody-blotched). *fl.* smaller than usual, pale yellow, with irregular bright crimson spots. (B. M. 3806, under name of *O. Huntianum.*)

O. c. Swartzii (Swartz's). *fl.* whitish, variegated with ferruginous and purple; petals paler. (B. M. 777, under name of *Epidendrum undulatum.*)

O. Cavendishianum (Cavendish's).* *fl.* yellow, produced in great abundance from strong, branching panicles. Winter. *l.* large, broad, fleshy, rich and lively green. Guatemala. (B. M. 3807, under name of *O. pachyphyllum.*) [T.]

O. C. longifolium (long-leaved). This variety has large "flowers, in a dense panicle; lateral lobes of lip dolabriform; sepals and petals very blunt. *l.* long, spreading on the ground" (Lindley). SYN. *O. longifolium.* (B. R. 1842, 4.)

O. Cebolleta (Cebolleta).* *fl.* yellowish-red, spotted; sepals and petals obovate-acute; middle segment of lip reniform, wavy; crest wavy, truncate; wings of column scimitar-shaped; scape panicled, stiff. Summer. *l.* terete, subulate. *h.* 1ft. Carthagena, 1824. (B. M. 3568; B. R. 1994.) [T.]

O. cheirophorum (hand-bearing). *fl.* bright yellow, very sweet-scented, about ½in. in diameter; scape slender, drooping, bearing an elongated, densely crowded cluster of blossoms. *l.* linear-lanceolate, 3in. to 6in. long. Pseudo-bulbs compressed, with sharp margins, about 1in. long. Panama, 1860. (B. M. 6278.) [C.]

O. chrysornis (golden-bird). *fl.* yellow, with four or five cinnamon spots, very numerous, borne in a wide, zigzag panicle. *l.* one or two to a bulb, cuneate-lanceolate, acute. Pseudo-bulbs small, narrow, ligulate, shouldered. Ecuador, 1881. [C.]

O. chrysothyrsus (golden-thyrsed).* *fl.*, sepals and petals green, streaked with red; lip large, bright yellow; panicle branching, about 3ft. long, many-flowered. Pseudo-bulbs oblong, compressed, two-leaved. South Brazil, 1867. A very showy species, with a free, compact growth, and remaining in blossom for a long time. (W. S. O. ser. ii. 5.)

O. ciliatum (fringed-lipped). A synonym of *O. barbatum ciliatum.*

O. citrinum (citron-coloured). This is the correct name of plant described in this work as *Cyrtochilum citrinum.*

O. concolor (one-coloured).* *fl.* rich golden-yellow, 1½in. to 2in. in diameter; lip large and flat; racemes long, drooping, many-flowered. Early summer. Organ Mountains, 1839. A very distinct and singular species. (B. M. 3752.) [C.]

O. cornigerum (horn-bearing).* *fl.* yellow, spotted with red, very showy, disposed on a prettily-marked spike, which is formed after the growth is mature. Summer. Pseudo-bulbs 9in. long, bearing deep green leaves of a peculiarly thick and fleshy texture. Brazil, 1829. Very distinct. (B. M. 3486.) [C.]

O. crispum (curled-petaled).* *fl.* from 1in. to 2in. across; sepals and petals of a bright rich copper-colour; lip broad, similar in hue, the centre being blotched with golden-yellow; raceme erect, many-flowered. Winter. *l.* twin, oblong, often tinged with bronze. Pseudo-bulbs brownish, fluted, 1in. to 2in. high. Organ Mountains, Brazil. See Fig. 728. (B. M. 3499; B. R. 1920.) There are several varieties of this very distinct species, all more or less beautiful. The following are most desirable: *grandiflorum,* having the flowers unusually large (F. M. 435); *marginatum,* in which the sepals and petals are broadly margined with rich golden-yellow; and *olivaceum,* with olive-green flowers, having

Oncidium—*continued.*

the basal area of the front lobe of the lip yellow, and the calli, column, wings, and a few blotches at the base of the lip, purple-black.

O. crista-galli (cockscomb). *fl.* lemon-colour, having a few pink blotches on both sepals and petals, rather large, racemose. *l.* cuneate-ligulate. Peru, 1870. An elegant, small-growing species.

O. Crœsus (Crœsus). *fl.*, sepals and petals greenish-yellow, tinged with brown; lip large, rich golden-yellow, the crest prominent and deep velvety black; scapes short, few-flowered. Summer. Pseudo-bulbs slender, tapering upwards, supporting a pair of light green leaves. Tropical America, 1872. A pretty, dwarf-growing species. (F. M. n. s. 40.)

O. cruciatum (cruciate). *fl.*, sepals and petals bright yellow and red, the sepals mostly obovate-obtuse, the petals ligulate; lip trifid, white, with two additional slender horns over the lateral ones; panicle loosely-flowered. Winter. *l.* solitary, obscurely nerved, somewhat coriaceous, acute. Pseudo-bulbs clustered, nearly cylindrical, furrowed. Brazil, 1838. SYN. *O. pubes flavescens.* (B. M. 3926.)

O. cryptocopis (hidden-sword). *fl.* chestnut-brown, with yellow streaks, and a yellow margin around the crisped and toothleted sepals and petals; superior petal with a long claw and two auricles at its base; lower petals with very short and broad claws; lip highly curious, having triangular laciniæ, of a purplish-brown colour, with a bent forward anterior part, and many toothlets on the posterior side; the claw whitish flesh-colour, and the border sulphur-yellow; wings purplish-brown, with two swordblade-like laminæ under the stigmatic hollow; spike many-flowered. Spring. Peru, 1870. A rare species, having flowers as large as those of *O. serratum.* (B. M. 5858.)

O. cucullatum (hooded).* *fl.* usually purplish-brown, with a large lip, which is rosy-lilac or rosy-purple, spotted with deep purple; spike slender, erect, bearing from three to six or more beautiful blossoms. *l.* solitary, linear-oblong, acute. Pseudo-bulbs small, oblong. Peru, New Grenada, &c. This very variable, dwarf species may be grown either upon a block of wood or in a pot; it must never be dried off, but kept slightly moist all the year round, when it will prove almost a perpetual blossomer. (L. & P. F. G. 87.) There are a number of varieties of this species; all are handsome, and last a long time in full beauty. [C.]

O. c. flavidum (yellowish). *fl.*, sepals and petals yellow, blotched with brown; lip purple, margined with white. Spring. New Grenada. Similar in habit to the type, and most desirable. [C.]

O. c. giganteum (giant). This is simply a fine variety, differing from the type only in its larger flowers and more robust habit. [C.]

O. c. macrochilum (large-lipped).* *fl.*, sepals and petals rich plum and crimson; lip mauve, spotted with dark violet. New Grenada. A distinct variety, growing about 1ft. high, and producing flower-spikes 2ft. in length, upon which are borne its beautiful flowers. [C.]

O. c. nubigenum (cloud-born). *fl.*, sepals and petals brownish, with a crimson or nearly crimson hue, or striped with crimson lines; lip very variable, but generally white, yellow at the base, marked with violet or purple. Andes, 1867. SYN. *O. Denisonianum.* (B. M. 5708.) [C.]

Other varieties are: *Dayanum*, white, purple; *Phalænopsis*, brown, white, purple, yellow; and *spathulatum*, sepals and petals spotted, lip spotted at base.

O. curtum (shortened). *fl.*, sepals and petals yellow, barred and blotched with cinnamon-brown; lip golden-yellow, spotted towards the margin with dark purple; spikes long, branching, many-flowered. Spring. Brazil, 1875. A very handsome and distinct species, of compact growth, and resembling *O. crispum* in foliage and shape of the pseudo-bulbs. (B. R. 1847, 68.)

O. dactylopterum (finger-winged). *fl.* yellow, with brown spots, disposed in small, loose panicles. *l.* linear-lanceolate. Pseudo-bulbs pyriform. Columbia, 1875.

O. dasystyle (thick-styled).* *fl.*, sepals ochre colour; petals brownish-purple; lip bright yellow, with a long purple callus, and some purplish veins on the base. January. *h.* 6in. Brazil, 1873. (B. M. 6494.) A handsome, dwarf-growing species.

FIG. 728. FLOWERS OF ONCIDIUM CRISPUM.

O. decipiens (deceptive). *fl.* yellow; upper sepals obtuse, lateral ones acute; petals obtuse, undulated, larger; lateral lobes of lip small, almost round, unguiculate; middle lobe much larger, bilobed; scape simple, usually one-flowered. *l.* ensiform, shortly equitant. *h.* 3in. Mexico, &c., 1835. (B. R. 1911, under name of *O. iridifolium.*)

O. deltoideum (triangular). *fl.* yellow, arranged in a large, stiff, compact panicle; sepals and petals whole-coloured; crest of the lip reaching more than half-way from the base to the point, consisting of numerous straggling warts and teeth. Peru, 1836. (B. R. 2006.)

O. Denisonianum (Denison's). A synonym of *O. cucullatum nubigenum.*

O. diadema (diadem).* *fl.* about 100 to a stem; sepals and petals shining chocolate-brown; lip fine yellow; the extremities of the petals, joined together above the column, present the aspect of a diadem (whence the specific name); flower-stem 2ft. to 3ft. high, branched. Pseudo-bulbs large. Cool region of equatorial America, 1866. [C.]

O. diadema (diadem), of gardens. A synonym of *O. serratum.*

O. dimorphum (two-formed). *fl.* yellow, spotted with brown, paniculate; lip sometimes three-lobed, and sometimes almost entire. *l.* oblong-lanceolate, bluntish. Pseudo-bulbs oblong, compressed. Brazil, 1870. (R. G. 637, Figs. 4-6.)

Oncidium—*continued.*

O. diodon (two-toothed). *fl.* brown; lip emarginate, square, with a light yellow callus. Pseudo-bulbs like those of *O. macranthum*. 1880.

O. divaricatum (spreading).* *fl.* produced on long, branching spikes; sepals and petals yellow, blotched and barred with brown; lip orange-yellow. Summer. *h.* 1½ft. Brazil, 1826. An easily-grown, free-flowering species. (B. R. 1054; L. B. C. 1212.)

O. dubium (doubtful). *fl.*, upper sepal brown, edged with white; lateral ones white, with obscure purple dots; lip pandurate, the front lobe brown, margined with white, lateral lobes streaked with violet. *l.* minute, carinate, 2in. to 2½in. long. Plant bulbless, of dwarf habit. (I. H. 1873, 184.)

O. elegantissimum (very elegant). *fl.*, sepals brown, with narrow, yellow bands; petals broad, with a few yellow spots; lip very bright yellow, the anterior limb beautifully marbled and dotted with light brown, and the calli of the base with blackpurplish borders; panicle large, many-flowered. Winter. Brazil (?), 1877. [T.]

O. endocharis (beautiful). *fl.* bright orange, about five; sepals and petals cuneate-oblong, acute; lip ligulate, with a broader, rhombic, emarginate blade, with two large lamellæ and three teeth at the base; raceme slender. 1884. A small species.

O. Eurycline (Eurycline). *fl.*, sepals and petals light reddish-ochre, with a few dark bars at their base; lip yellow, with a brown spot on the isthmus; basal auricles rounded, retrorse, narrower than the front blade. *l.* blunt. 1884.

O. euxanthinum (beautiful yellow).* *fl.*, sepals and petals small, greenish-yellow, banded with brown; lip large, rich yellow; spikes ample, many-flowered. Brazil, 1869. A very pretty species, with the habit of *O. bifolium*. (B. M. 6322.)

O. exasperatum (rough). *fl.* chestnut colour, having asperities on the outer side of the sepals and petals; lip yellowish, with brown bars and an orange callosity. Ecuador, 1871.

O. excavatum (hollowed).* *fl.*, sepals and petals golden-yellow, spotted and blotched at the base with rich bright brown; lip golden-yellow, very convex at the base, a little hollowed out in front, and excavated with a deep pit in the under side; panicle much branched, sometimes bearing upwards of a hundred blossoms. *l.* long, pale green. Pseudo-bulbs large, pale green. Peru, 1840. A robust-growing species. See Fig. 729. (B. M. 5293.) In a variety sometimes known as *O. aurosum*, the flowers are dark brown in the centre, and somewhat larger in size than those of *O. excavatum*.

FIG. 729. PORTION OF PANICLE OF ONCIDIUM EXCAVATUM.

O. flexuosum (zigzag).* *fl.* yellow, spotted with brown, rather small, produced in abundance on a branched panicle 3ft. to 4ft. high. Pseudo-bulbs flat, borne at short intervals on a creeping stem, two-leaved. Brazil, 1818. A free-flowering species, of easy culture. (B. M. 2203.) The variety known as *majus* has much larger flowers, while that known as *radiatum* has beautiful, radiating, purplish-brown lines on the disk.

Oncidium—*continued.*

O. Forbesii (Forbes').* *fl.* large and very distinct; sepals, petals, and lip, with pale yellow edges, broad, the centre reddish-brown, except the eye or throat, which is white. November. Brazil, 1837. A beautiful species, nearly allied to *O. crispum*, but of stronger habit, and with much handsomer flowers. (B. M. 3705.)

O. F. Borwickianum (Borwick's). A handsome variety, having the whole lip bright yellow, with feathered blotches in lieu of a wide, brown, one-coloured disk, and a yellow spotted margin. 1879. (G. C. n. s., xi. 524.)

O. fuscatum (brown-stalked). A synonym of *Miltonia Warscewiczii*.

O. Gardneri (Gardner's). *fl.* brown, with a yellow lip, moderately large. "Very near *O. crispum* and *Forbesii*, from which it differs in the form and tuberculation of the lip, and the very small column-wings" (Lindley). Brazil.

O. Gautieri (Gautier's). *fl.* small, disposed in few-flowered racemes; sepals and petals dark brown, lanceolate; lip subcordate, semi-orbicular, crenulato-undulate, broader than long, yellow, with a deep blood-red spot, from which projects a long, curved, yellow horn. *l.* linear-lanceolate, coriaceous. Pseudobulbs oblong, sulcate, one-leaved. Brazil, 1869. (R. G. 611, Fig. 2.)

O. globuliferum (globule-bearing). *fl.* golden-yellow, with red spots at the base of sepals, petals, and lip; sepals cuneate-oblong, acute; lip sagittate; peduncles axillary, branched, long or short. *l.* ligulate, small. Pseudo-bulbs small, glaucous, oblong, produced at long intervals on the slender, creeping, filiform rhizomes. Columbia.

O. g. costaricense (Costa Rica). This is considered to be only a local variety, with smaller flowers. Costa Rica, 1871.

O. glossomystax (bearded-tongued). *fl.* light yellow, with a few brown blotches, rather large, almost sessile, having two pairs of keels on the basilar disk of the lip, all of which are covered with white hairs. New Grenada, 1880. A minute plant, with Iris-like leaves.

O. graminifolium (grass-leaved). *fl.* disposed in a sub-paniculate raceme; lip yellow, wedge-shaped, with rounded angles. *l.* linear-ensiform, acute, erect, shorter than the raceme. Mexico. [C.]

O. g. filipes (thready). *fl.*, sepals and petals brownish, clouded; lip emarginate, somewhat lobed; raceme nearly or quite as long as the scape. (B. R. 1841, 59, under name of *Cyrtochilum filipes*; L. S. O. 48, under name of *O. filipes*.)

O. g. Wrayæ (Wray's). *fl.* panicled; sepals and petals bright yellow, with deep brown spots; lip emarginate, somewhat four-lobed. (B. M. 3854, under name of *O. Wrayæ*.)

O. grandiflorum (large-flowered). *fl.* closely resembling those of *O. macranthum*, but the petals are more acute, and both the petals and odd sepal are more crisp, embellished by a yellow border; lip with a spathulate lacinia, and a quite distinct, flat callus, totally wanting the keel of the middle line; peduncle very large, many-flowered. Summer. Columbia, 1881. A very beautiful but rare species.

O. gyrobulbon (twisted-bulbed). *fl.* yellow, with dark spots at the base of the lip; inflorescence panicled. Pseudo-bulbs oblong-pyriform, at length becoming twisted. 1869. [C.]

O. hæmatochilum (bloody-lipped). *fl.*, sepals and petals greenish-yellow, blotched with chestnut; lip rich crimson and rose; spikes erect, with several moderate-sized blossoms. Winter. *l.* short, thick, fleshy, dark green. *h.* 6in. New Grenada, 1857. A compact-growing species, similar in habit to *O. Lanceanum*. (L. & P. F. G. 6.) [T.]

O. Harrisonianum (Harrison's). *fl.* yellowish-purple, spotted; sepals and petals linear obtuse; lip three-lobed, middle segment emarginate; crest five-lobed, downy in the centre; panicle branched, many-flowered. Autumn. *l.* fleshy, linear-oblong, acute, recurved. Pseudo-bulb sub-globose, one-leaved. *h.* 1ft. Brazil, 1830. (B. R. 1569.)

O. hastatum (halbert-shaped). *fl.*, sepals and petals yellowish, with many brown dots; lip yellowish-white, with a darker yellow callus; inflorescence panicled. Mexico.

O. hebraicum (Hebrew). *fl.* yellow, with dark maroon blotches, growing in long, slender, short-branched panicles; lip having a small blotch on each auricle, and a similarly coloured patch around and before the crests. *l.* cuneate-ligulate. Pseudo-bulbs oblong, compressed, wrinkled. New Grenada, 1875.

O. Hrubyanum (Hruby's). *fl.* brown, barred with yellow at the bases of the sepals and petals, small, in a dense panicle. 1883. A curious species.

O. Huntianum (Hunt's). A synonym of *O. carthaginense sanguineum*.

Oncidium—*continued.*

O. hyphæmaticum (blood-red). *fl.* blood-red on the outside, large; sepals and petals purplish-brown, blotched with a deeper hue of the same colour; lip rich deep yellow; raceme loose, branching. Summer. *l.* solitary, oblong-lanceolate, obtuse. Pseudo-bulbs small, oblong. Ecuador, 1869.

O. incurvum (incurved).* *fl.* pure white, streaked and blotched with lilac and brown, very fragrant, rather small in size; scapes about 3ft. in height, much branched, bearing an immense number of flowers. Autumn and winter. *l.* pale green, as are also the pseudo-bulbs. Oaxaca, Mexico, 1839. A very elegant, dwarf, compact-growing, cool-house species. (B. R. 1845, 64.) [C.]

O. l. album (white). A handsome, white-flowered variety. 1882. (I. H. 444.)

O. insculptum (carved). *fl.* of a cinnamon-brown colour, with a yellowish-white border, undulated, disposed in large panicles; lip pale yellow at the base. Tropical America, 1872.

O. Jamiesoni (Jamieson's). *fl.* yellow, spotted with violet-purple; upper sepals, and the unguiculate, hastate petals, with basal or median purple blotches; lip bright yellow, broad, pandurate; inflorescence large. Peru, 1878.

O. janëirense (Rio de Janeiro). A synonym of *O. longipes.*

O. Jonesianum (Jones').* *fl.*, sepals and petals whitish-ochre, with brown blotches, cuneate-oblong, wavy, erect; lip with small, light yellow auricles and a white blade, marked with a few purple and brown blotches; callus of two patellar bodies, the smaller one in front, and traversed by a strong keel. *l.* subulate, thin.

O. Kappleri (Kappler's). *fl.* yellow, brown; column-wings crisp, lobed, extended into a toothed, truncated, ligulate appendage at the base, resting on a pair of projecting angles. *l.* ensiform, similar to those of *O. altissimum.* Surinam, 1880.

O. Kienastianum (Kienast's). *fl.* yellowish-brown at first; petals yellow, with numerous brown bars and spots; afterwards, the colour deepens, and the stalked ovaries are dark purplish; otherwise, the flowers resemble those of *O. trilingue.* *l.* and pseudo-bulbs similar to those of *O. serratum.* Peru, 1878.

O. lamelligerum (ridge-bearing). *fl.*, upper sepal deep brown, with a yellow border, reniform, wavy, stalked; lower ones longer, stalked, oblong, unequal at base, cuneate on one side, semi-hastate on the other; petals yellowish, with brown patches, having broad claws, suddenly hastate, oblong, obtuse, undulate, complicate, crisp; lip trifid, with remarkable lamellæ, the side ones of the anterior retrorse and lobed. Ecuador, 1877. [C.]

O. Lanceanum (Lance's).* *fl.* with an exquisite fragrance of vanilla; sepals and petals large, thick, and fleshy, ground-colour yellow, tinged with green, barred and blotched with chocolate-brown, in some instances almost with crimson; lip large, rich violet in its lower portion, rose above; spike erect, many-flowered. *l.* thick, leathery, large, bright green, beautifully spotted with reddish-brown. Demerara and Surinam, 1834. A very handsome plant, considered by some growers to be the best of the genus; it is, however, rarely seen in good condition. (B. R. 1887.) There is a most desirable variety in which the lip is pure white. In another form (*Louvrexianum*) the flowers are yellow, prettily spotted and marbled, the lip deep mauve at the base, white in front. [T.]

O. Lansbergii (Lansberg's). *fl.* honey-yellow-green, with blotches of chestnut colour, three or four in a slender raceme. *l.* cuneate, cordate-oblong, obtuse, very cartilaginous. Pseudo-bulbs minute, one-leaved. Venezuela, 1876.

O. Lemonianum (Sir Charles Lemon's). *fl.* yellow, marked along the back with red spots, about ⅜in. in diameter; lip of a brighter colour, very handsomely spotted with red; column also yellow; spike 10in. long, and about six-flowered. Summer. Cuba, &c., 1836. A pretty and curious species, of very dwarf growth. (B. R. 1789.) [C.]

O. lepidum (charming). *fl.* yellowish, blotched with brown, disposed in a large panicle; lip yellow, purple towards the base. Ecuador, 1870. A small species.

O. leucochilum (white-lipped).* *fl.*, sepals and petals greenish, transversely streaked with bands of brown, or, in some varieties, deep crimson, or in unison, lanceolate, undulate; lip large, at first pure white, but subsequently becoming yellow or yellowish; scapes stout, much branched, 6ft. to 10ft. in height. Winter. Pseudo-bulbs two-leaved, large, of a glaucous hue, and fluted. Mexico and Guatemala, 1835. SYN. *Cyrtochilum leucochilum* (F. d. S. 522).

O. l. Dawsonianum (Dawson's). *fl.* large; sepals and petals greenish-yellow, with blackish-maroon spots; lip yellowish-white, marked with purplish-violet. Mexico, 1873. A very fine variety.

O. l. speciosum (showy). *fl.*, sepals and petals sub-elliptic; lip pure white in all its stages. Mexico, 1874.

O. Limminghei (Limminghe's). *fl.* golden-yellow, richly spotted with brown; lip auricled, blunt, spreading; peduncle filiform, one or two-flowered. *l.* oblong-acute. Pseudo-bulb ovate, ancipitate. Caraccas, 1868. A very singular species, with habit similar to that of a Sophronitis. (F. d. S. 1827.) [C.]

O. linguiforme (tongue-shaped). *fl.* yellow, with a pale purplish lip, which is pandurate, obtuse, and has three keels on the basal part, the middle one being much the shortest; panicle lax, at the end of a very long, weak scape. Venezuela, 1879. Plant of large growth.

O. litum (daubed). *fl.*, petals brown, with a yellow border; lip yellow, blotched with brown on the hinder part, and entirely brown in front; the callus consists of a central ligulate body, with two blunt front lobes, covered with blunt papillæ, and on each side is a curved line of papillæ. Brazil, 1883.

O. longifolium (long-leaved). A synonym of *O. Cavendishianum longifolium.*

O. longipes (long-stalked). *fl.*, sepals and petals greenish-yellow, streaked or suffused with reddish-brown; lip broad, of a rich deep yellow, the crest being prominent, and surrounded by a broad, blood-coloured ring; scape slender, few-flowered. Summer. *l.* twin, narrow, fleshy. Pseudo-bulbs in clusters, from a creeping rootstock. Organ Mountains. A very dwarf-growing species. SYN. *O. janëirense.* [C.]

FIG. 730. FLOWER OF ONCIDIUM LURIDUM.

O. luridum (lurid). *fl.* usually of a dull yellow or olive-green, blotched or spotted with brown; panicle long, much branched, attaining sometimes the length of 8ft. or 9ft., many-flowered. *l.* large, fleshy, with a sharp keel behind, and of a dark green colour. Mexico, &c., 1822. A very desirable but not showy species. See Fig. 730. (B. M. 3603.) [T.]

O. l. Dodgsoni (Dodgson's). A splendid but rare variety, having orange and yellow flowers, barred with dark brown, and numerously disposed on much-branched spikes 7ft. long. West Indies.

O. l. guttatum (spotted). A fine form, producing long spikes of yellow, brown, and red flowers. (B. R. 1839, 16.)

O. l. Morreni (Morren's). *fl.* pale rose colour, spotted with crimson, and tipped with yellow.

O. l. roseum (rosy). *fl.*, sepals and petals rosy, mottled with white, and bordered with yellow.

O. macranthum (large-flowered).* *fl.* from 3in. to 4in. in diameter; sepals and petals roundish, oblong, thick, tough, and leathery in texture, golden-yellow, tinged with purplish-brown or purplish-red, the petals being also often streaked with crimson; lip hastate, thick and fleshy, with a white crest, the middle lobe being yellow, and the lateral ones rich purplish-brown; panicle climbing and branched, producing a large number of flowers. Spring and early summer. *l.* narrow, 1ft. long, bright green. Pseudo-bulbs 3in. long, flask-shaped, much ribbed. Central America to Peru, 1867. One of the handsomest orchids grown. It has numerous varieties, some being of very second-rate merit. (B. M. 5743; F. M. 386.)

O. macropus (long-stalked). *fl.* yellowish, with a few transverse blotches and bars, panicled. Pseudo-bulbs resembling those of *O. macranthum.* Ecuador, 1868.

O. maculatum (spotted). The proper name of plant described in this work as *Cyrtochilum maculatum.*

O. Marshallianum (Marshall's).* *fl.* from 2in. to 3in. across, of a rich golden-yellow, marked with brown spots and blotches. South America, 1866. A handsome plant, closely resembling *O. crispum,* but its pseudo-bulbs and leaves are pale green instead of reddish-brown or bronze-coloured. (B. M. 5725.)

O. Martianum (Martius'). *fl.*, sepals and petals bright yellow; lip very large, deep yellow on the upper side, almost white underneath. Autumn. Brazil, 1841. A very handsome species, thriving best when grown on a block, suspended from the roof. *O. bicolor* (B. R. 1843, 66) only differs from this in the petals being spotted.

O. Massangei (Massange's). *fl.* in a long, racemose panicle; sepals and petals yellow, blotched with purple-brown to just above their middle; lip with oblong, truncate, spreading auricles at base, and a broad, dilated, bilobed front part, yellow, with a band across the base of each auricle, and at the base of the dilated front part, of purple-brown; crest also spotted with purple-brown. *l.* linear, acute, 1ft. or more long, 1½in. broad. Central America, 1878.

Oncidium—*continued.*

O. meirax (boy). *fl.* with little yellow and brown spots; sepals and petals linear, a little narrowed at the base; lip cordate, acuminate; scape two-flowered. *l.* solitary on the oblong pseudo-bulbs, slightly emarginate. Caraccas and New Grenada, 1880. A singular plant, only a few inches high. (R. X. O. t. 18, Fig. 3.) [C.]

O. melanops (black-eyed). *fl.* light yellow, with the bases of the sepals, petals, and lip blackish-purple. Ecuador, 1881. In habit, this species resembles *O. chrysomis.*

O. meliosum (honey-scented). *fl.* very rich yellow, with cinnamon blotches; small sepals, as well as the much larger petals, retuse; basilar auricles of the lip square, the isthmus middle-sized, and the anterior part reniform; column very small, of the most

Oncidium—*continued.*

O. monoceras (one-horned). A synonym of *O. unicorne.*

O. nigratum (blackish). *fl.* cream colour, with dark blackish-brown spots and bands, disposed in branched panicles; sepals and petals linear-lanceolate, equal, and wavy. Guiana.

O. oblongatum (oblong-leaved).* *fl.* bright yellow, of good size. Winter. *l.* bright green, oblong, about 1ft. long. Pseudo-bulbs short, thick. Guatemala, &c., 1844. A handsome, free-flowering species. (L. & P. F. G. ii. 9, Fig. 137.)

O. obryzatum (refined). *fl.* bright golden-yellow, barred with brown, about 1in. across, yielding a delicious perfume; spikes numerous, long-branched, and many-flowered. Winter. Peru, 1863. An easily-grown and very free-flowering species. (R. G. 925.)

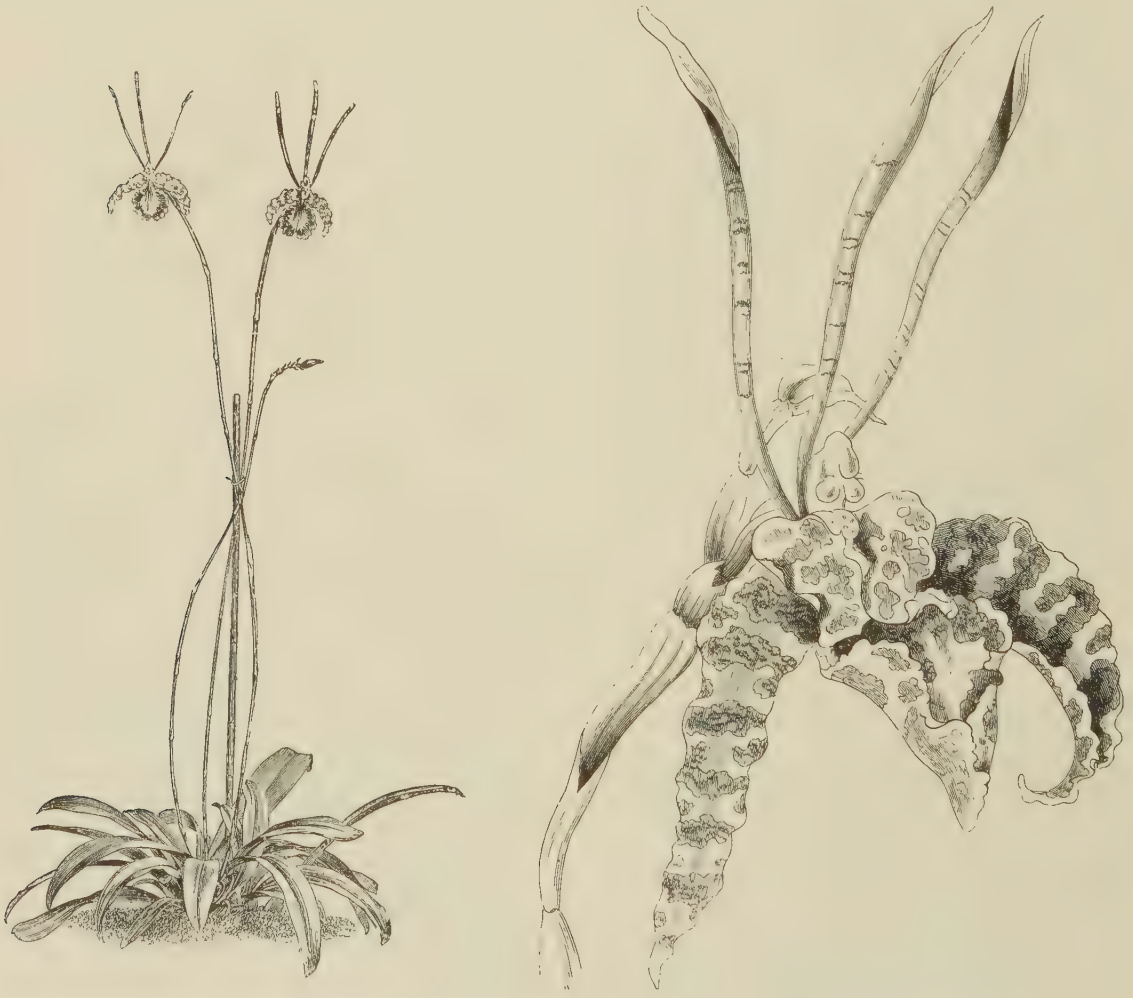


FIG. 731. ONCIDIUM PAPILIO, showing Habit and detached Flower.

pallid sulphur-white, as well as the callus; panicle branched. Summer. *l.* cuneate-oblong, ligulate, acute. Pseudo-bulbs oblong. 1882.

O. metallicum (metallic). *fl.* rich chestnut-brown, with a splendid metallic hue; the borders of the short, ovate, broad, superior sepal and smaller petals blotched with rich yellow; lip pandurate, with an angle projecting from each side. New Grenada, 1876. Very distinct.

O. Millianum (Mill's). *fl.* bright yellow, mottled with brown, the five sepals and petals nearly equal; lip bent at the base, brown in the middle; column very short, two-winged; panicle ample, loose-flowered, diffuse. Spring. *l.* ligulate, obtuse. Pseudo-bulbs ligulate, compressed. Columbia, 1878.

O. octhodes (tubercled). *fl.* yellow, having the lip painted with brownish bars, large, distinct, borne in an effuse panicle. Ecuador, 1871. A handsome orchid. [C.]

O. onustum (loaded). *fl.* rich golden-yellow, disposed in dense, nodding racemes. Winter. Panama, &c., 1848. A handsome species, with the habit of *O. bifolium*, but the pseudo-bulbs are beautifully spotted.

O. ornithorhynchum (bird's-bill).* *fl.* soft rose-purple, yielding a perfume somewhat resembling that of the Heliotrope, but less powerful; scapes produced in great abundance, and the gracefully drooping panicles thickly laden with the comparatively small blossoms. Autumn and winter. *l.* twin, oblong. Pseudo-bulbs glaucous, 1in. to 2in. high. Mexico, &c. 1826. A well-marked

Oncidium—*continued.*

and very distinct species, of compact, dwarf-growing habit. (B. M. 3912; B. R. 1840, 10.) [C.]

O. o. albiflorum (white-flowered).* A valuable acquisition as a winter blossomer, having snow-white flowers. It is, however, very rare. Guatemala, 1873. Sometimes known as *O. o. album.* (F. M. 398.) [C.]

O. pachyphyllum (thick-leaved). A synonym of *O. Cavendishianum.*

O. Papilio.* Butterfly Plant. *fl.* pale golden-yellow, barred with chestnut-brown, usually solitary and terminal on the spike, somewhat resembling a large butterfly in shape; sepals long, narrow, erect, bearing a fanciful resemblance to the antennæ and proboscis of a butterfly; petals extending horizontally to form the wings, and the lip representing the body. *l.* deep olive-green, beautifully streaked and spotted with reddish-brown. Pseudo-bulbs somewhat compressed, one-leaved. Trinidad, 1823. A remarkable and beautiful plant. It succeeds best upon a large block of wood, and with good exposure to sun and light. The flowers are often 2in. across. The old spikes should not be cut off, as new buds are continually developed at the apex. See Fig. 731. (B. M. 2795; B. R. 910.) [T.] There are some striking varieties of this species, of which the following are noteworthy:

O. P. album (white). A very rare form, with white flowers.

O. P. Eckhardti (Eckhardt's). A fine and large-flowered variety. (I. H. 500.)

O. P. Kramerianum (Kramer's).* *fl.* rich golden-yellow, with a profusion of irregularly disposed, bright brown spots and blotches; the margins of the lip and lateral sepals beautifully undulated and crisped; spike long, contracted at intervals, forming knotty joints, one-flowered. *l.* solitary, large, coriaceous, beautifully spotted with crimson and red, upon a dark ground. Pseudo-bulbs cylindrical, deep brown. Central America, 1823. A very beautiful plant. (R. X. O. 33.) [T.]

O. P. limbatum (bordered). *fl.* clear yellow, with distinct cinnamon-brown blotches, and a broad, uninterrupted margin of the same hue. (B. M. 3733.)

O. pectorale (breast-plate). *fl.* bright yellow, thickly spotted, blotched, and barred with reddish-brown; lip having at its base a number of tubercles, curiously arranged, and studded with little button-like knobs. Spring. Brazil, 1842. A curious and handsome species.

O. peliogramma (blackish-dotted). *fl.* pale yellow, slightly marked with pallid dots and bars, paniculate. Chiriqui, 1871.

O. Phalænopsis (moth-like).* *fl.*, sepals and petals nearly equal, of a soft cream colour, beautifully spotted and streaked with crimson and violet; lip large, ground colour creamy-white, having a rich yellow crest, and covered with spots and bars in a similar manner to the sepals and petals; spike erect, three to six-flowered. *l.* twin, narrow, borne upon the summit of the ovate, deep green pseudo-bulbs, which are 3in. long. Peru, 1869. A beautiful, dwarf-growing species, blossoming at various periods, and continuing a long time in full beauty. When out of flower, it cannot be distinguished from some of the varieties of *O. cucullatum.* (I. H. 1870, 13.) [C.]

O. phylloglossum (leaf-tongued). *fl.* shining, light horse-chestnut-brown; sepals and petals bordered with light yellow, the odd sepal and the petals being unusually wavy; lip with yellow borders at the very base and a white top, triangular; calli light yellow; panicle branched. *l.* cuneate-lanceolate, acutish. Pseudo-bulbs oblong-pyriform, two-leaved. Columbia, 1880.

O. phymatochilum (long-lipped). *fl.*, sepals and petals yellow and reddish-brown; lip white. Summer. *l.* dark green, about 1ft. long. Pseudo-bulbs thick. Brazil, 1844. A very pretty species, with remarkably curious flowers. (B. M. 5214.)

O. plagianthum (athwart-flowered). *fl.* brown, with oblong sepals and petals; lip triangular. A curious species.

O. planilabre (flat-lipped). *fl.* yellow; sepals and petals lanceolate, acuminate, wavy, nearly equal; middle segment of lip semicircular, flat; crest rhomboid, cuspidate; raceme simple. Autumn. *l.* ensate. Pseudo-bulbs two-edged, slender, ribbed. *h.* 1½ft. Brazil, 1848. (J. H. S. vi. 5.)

O. plicigerum (fold-bearing). *fl.* brown, small, disposed in short, branched panicles; lip purplish-brown at the base. Ecuador, 1873.

O. porrigens (extending). *fl.* chestnut-brown, with honey-coloured tips; lip cinnamon colour, with an orange callosity, and some deeper spots. New Grenada, 1868.

O. præstans (excelling). A hybrid, probably between *O. dasystyle* and some species like *O. Gardneri.* It is superior to the first, has brighter colours, but lacks the blackish border of the basilar portion of the lip, and it resembles the last in the system of calli.

O. prætextum (bordered).* *fl.* very fragrant; sepals and petals brown, edged and barred yellow; lip yellow, with a margin of brown, broken with yellow blotches and lines. Brazil, 1876. A handsome species, of which the collector said: "The flowers are most elegantly placed in a very light and feathery-looking inflorescence, and have, at the same time, a heavenly smell."

Oncidium—*continued.*

O. pubes (downy). *fl.* yellow-brown, spotted, with a fiddle-shaped lip; panicle simple, many-flowered, sub-secund. Autumn. *l.* lanceolate. Pseudo-bulbs cylindrical, one-leaved. *h.* 1ft. Brazil, 1824. (B. M. 3926.) [C.]

O. p. flavescens (yellowish). A synonym of *O. cruciatum.*

O. pulchellum (neat). *fl.* white, tinged with yellow and pink, about 1in. across; panicles many-flowered, drooping, 1ft. long. Summer. Pseudo-bulbs and leaves small. *h.* 6in. West Indies. An elegant, dwarf-growing species, which thrives well on a block, if supplied with plenty of moisture at the roots. (B. M. 2773; B. R. 1787.) [T.]

O. pulvinatum (cushion-like). *fl.* yellow, orange, and brown; panicles sometimes 10ft. long. Summer. Brazil, 1836. A free-flowering, compact-growing plant, remaining a long time in perfection. (B. R. 1839, 42.) The variety *majus* is very desirable. [T.]

O. pumilum (dwarf). *fl.* yellow, numerously produced on short, dense, upright, branching panicles. Spring. *h.* 6in. Brazil, 1824. A rare and pretty species. (B. M. 3581; B. R. 920; L. B. C. 1732.) [T.]

O. pyxidophorum (box-bearing). *fl.* yellow, with a little box at the base of each lip, and with serrulated wings to the column. This plant is otherwise much like *O. cornigerum* and *O. pubes.*

FIG. 732. FLOWER OF ONCIDIUM SERRATUM.

O. reflexum (reflexed). *fl.*, sepals and petals regularly speckled with brown; lip with a few red specks at the base. Mexico. (R. X. O. i. 93, t. 36.)

O. r. pelicanum (pelican-beaked). *fl.*, sepals bright yellow, spotted with crimson near the base; lip with a rich crimson stain around the crest. Mexico. (B. R. 1847, 70, under name of *O. pelicanum.*)

O. Retemeyeranum (Retemeyer's). *fl.* pale yellow and chocolate-brown, with a deep violet lip, disposed in a raceme. *l.* oblong. Mexico, 1869. A small, almost bulbless orchid. (Ref. B. ii. 74.)

O. rostrans (beaked). *fl.* gay-coloured, disposed in dense clusters. Pseudo-bulbs pyriform. Columbia, 1875.

O. rotundatum (rounded). *fl.* brown, small, with yellowish tips to the sepals, petals, and lip, and the base of the lip yellow inflorescence 9ft. to 12ft. long, branched near the end. 1873.

O. rupestre (rock).* *fl.* brilliant golden-yellow, spotted with brown, very numerous, produced on a much-branched panicle 2ft. high and 1ft. wide. *l.* ligulate, about 1ft. long, dark green. Pseudo-bulbs smooth, stout, pale green. Peru. A very desirable plant.

O. Russellianum (Duke of Bedford's). A synonym of *Miltonia Russelliana.*

O. rusticum (rustic). *fl.*, sepals and petals onion-green, with light brown blotches; lip pale yellow, with many brown bars, and an orange-coloured callus; panicle ample, zigzag. Ecuador, 1870.

Oncidium—*continued.*

O. saltabundum (dancer). *fl.* ochre, blotched with brown, small, short-lipped; inflorescence zigzag. New Grenada, 1883.

O. sarcodes (flesh-like).* *fl.* orange-yellow, profusely dotted and blotched with crimson; scape attaining a considerable length, bearing a much-branched panicle, of two, three, or more feet in length, and clothed with a profusion of large blossoms. Spring. *l.* twin, shining green, broad, obtuse. Pseudo-bulbs very dark green, tapering upwards from the base. Brazil. Habit very neat and compact for so large a plant. (W. S. O. 23.)

O. Schlimii (Schlim's). *fl.* bright yellow, with irregular bars of brown, about 1in. in diameter; panicle long, having short racemes along each side of the main stem. November. Central America. A tall, rambling species. [T.]

O. Semele (Semele). *fl.* yellow, smaller than those of *O. calanthum* (to which this species is allied), and having a few purplish streaks and blotches; lip broad, reniform. Ecuador, 1870. A handsome plant.

O. serratum (saw-tooth-petaled).* *fl.* usually of a rich bright brown, with a yellow border, and crisped or much-serrated margins; petals drawn together in such a way as to form an arch above the column; spike twining and branched, 6ft. to 12ft. long, bearing numerous large blossoms. *l.* twin, ensiform, 1ft. to 2ft. long. Pseudo-bulbs large, ovoid. Peru, 1850. SYN. *O. diadema*, of gardens. See Fig. 732. (B. M. 5632.)

O. sessile (stalkless). *fl.* large; sepals and petals broad, obtuse, of a golden-yellow, freckled with cinnamon-brown towards the base; lip broad, and similar in colour; scape bearing a much-branched raceme of numerous flowers. Spring. *l.* twin, pale green, short, strap-shaped. Pseudo-bulbs oblong, somewhat compressed, slightly ribbed. Caraccas, 1848. A compact-habited and free-growing plant. (L. & P. F. G. 21.) [T.]

O. sphacelatum majus (larger, scorched). *fl.* yellow, barred with dark brown, disposed on long, branching panicles, and remaining several weeks in perfection. Spring. Honduras, &c.

O. spilopterum (spotted-wing). A synonym of *O. Batemannianum spilopterum.*

O. splendidum (splendid).* *fl.* 2in. across; sepals and petals green, heavily barred with brown; lip large, of a rich bright golden-yellow; spike erect, branching, about 2ft. long. *l.* solitary, oblong, 4in. to 7in. long. Pseudo-bulbs 1in. high. Guatemala, 1862. One of the finest species in cultivation. (B. M. 5878, under name of *O. tigrinum splendidum*; F. d. S. 1825.)

O. stipitatum (stalked). *fl.* pale sulphur-yellow, with sepals and petals dotted with crimson, and a crimson stain below the crest; middle lobe of lip with a narrow isthmus, coarsely toothed and two-lobed, the lateral lobes falcate; wings of downy column half ovate, acute. Panama, 1844. (B. R. 1846, 27, under name of *O. lacerum.*)

O. s. platyonyx (broad-clawed). A variety having very numerous flowers, which are smaller than in the type; claw of lip broader, and, on each side of the anterior callus, a callus ridge. 1878.

O. stramineum (straw-coloured). *fl.* white, speckled with red on the lateral sepals, lip, and column, ¾in. across; sepals and petals widely spreading; lip very shortly clawed. *l.* 6in. to 8in. long, oblong-lanceolate, sub-acute. Pseudo-bulbs none. Mexico. (B. M. 6254; B. R. 1840, 14.)

O. Suttoni (Sutton's). A species of little interest, with very long, drooping, panicled racemes of dull yellow and brown flowers, and with narrow, grassy leaves. (L. & P. F. G. ii. 129.)

O. tectum (concealed). *fl.* yellow, spotted with rich maroon-brown, disposed in a zigzag panicle. *l.* narrow, linear-ligulate. Pseudo-bulbs pear-shaped, ancipitous. New Grenada, 1875.

O. teretifolium (terete-leaved). *fl.* bright yellow, small, in erect, many-flowered panicles. *l.* thickish, erect, terete. 1882. [T.]

O. tetracopis (four-bladed). *fl.*, sepals chestnut-brown, the superior one with a yellow border; petals bright yellow, with some brown, round blotches; panicle large. New Grenada, 1873.

O. tigrinum (tiger-striped).* *fl.* very large, having a Violet-like perfume; sepals and petals bright brown, transversely barred with deep yellow; lip very large, about 1½in. across, wholly rich deep yellow; panicles sometimes 3ft. in length. Winter. Mexico, 1840. A fine species, with a robust growth. (L. S. O. 48, under name of *O. Barkeri.*)

Oncidium—*continued.*

O. t. unguiculatum (claw-bearing). *fl.* yellow, large, produced on a branching spike, 3ft. to 4ft. in height, and remaining a long time in perfection. Winter. Mexico, 1846. A pretty species. (L. & P. F. G. ii. 134.)

O. tricuspidatum (three-cusped). *fl.*, sepals orange, with a brown mid-line; petals pale sulphur, with small brown spots and brown back; lip very shortly cuneate at base, with a large, oblong, two-lobed blade, sulphur, with bars at the base; peduncle panicled, longer than the leaves. Pseudo-bulbs narrow, one-leaved, and with a leaf at their base. Costa Rica, 1884.

O. trifurcatum (thrice-forked). *fl.*, borders of the reniform blade of sepals and petals light yellow, the latter free; lip crimson-lake, with light yellow calli; two sword-like blades stand under the stigma. Peru, 1884. Allied to *O. serratum.*

FIG. 733. FLOWERS OF ONCIDIUM VARICOSUM.

O. trilingue (three-tongued). *fl.*, sepals and petals rich chocolate-brown, edged with light yellow, the margins undulated; lip very singular in form, brown, with a yellow crest. Spring. Peru, 1850. A rare and very distinct species, closely allied to *O. serratum.* (L. & P. F. G. ii. 63.)

O. triquetrum (triangular-leaved). *fl.* greenish-white, spotted with dark purple, about 1in. across; raceme about twelve-flowered. Autumn. Jamaica, 1793. (B. M. 3393.) [T.]

O. trulliferum (trowel-lipped). *fl.* yellow, barred with brown spots. Autumn. Brazil, 1838. A small, and not very interesting species. (B. R. 1839, 57.)

O. unicorne (one-horned). *fl.* small; sepals green, lanceolate; petals narrow-obovate, yellow, blotched with rust-colour; lip three-lobed, yellow, blotched with red in the disk, the lateral lobes small and narrow, and the intermediate one transversely rhomboidal and notched at the apex; peduncle from the base of the pseudo-bulb, soon branching into a panicle. *l.* 5in. to 6in. long, oblong-lanceolate. Rio Janeiro, 1839. (B. M. 3890, under name of *O. monoceras.*) [C.]

O. u. pictum (painted). A pretty variety, with whitish sepals, and petals blotched with dark Indian purple; lip lemon-yellow, with dark brown blotches. 1880. [C.]

Oncidium—*continued.*

O. uniflorum (one-flowered). *fl.* pale brown, thinly spotted with reddish-purple; lip clear yellow, blotched and spotted round the crest; spikes short, one-flowered. Winter. *h.* 4in. Brazil, 1841. (B. R. 1843, 43.)

O. varicosum (varicose-veined).* *fl.*, sepals and petals pale dull green, banded with dull brown; lip bright yellow, large, with two ovate lateral ears, somewhat crenate in front, and a four-lobed middle lobe; crest of two triple teeth; scapes strong, glaucous, about 3ft. long, having a large, branching, eighty to ninety-flowered panicle. *l.* firm, ligulate-lanceolate. A beautiful, strong-growing species. Brazil. See Fig. 733. (L. J. F. 206, 207.)

O. v. Rogersii (Rogers').* *fl.* rich golden-yellow, 2in. or more in diameter; sepals and petals comparatively inconspicuous, the great attraction being the large flat lip, which is lobed in front; panicle much branched, and bearing, in a well-grown example, as many as 170 blossoms. Winter. *l.* somewhat short, dark green. Pseudo-bulbs large, ovate, deep green. Brazil, 1869. This is a rare variety, and, at the same time, one of the most beautiful. It will succeed on a block of wood, or in a pot or basket; the last is, perhaps, the most convenient plan for displaying its large, many-flowered panicles, and, at the same time, it insures perfect drainage. (B. H. 1878, 172; G. C. 1870, 277.)

O. variegatum (variegated). *fl.* pink, richly stained with cinnamon-red, about 1in. across; panicles branching, 1½ft. high, erect. Summer. *l.* dark green. *h.* 6in. West Indies, 1824. A pretty species. (L. & P. F. G. 33.) [T.]

O. vernixium (varnished). *fl.* disposed in a thyrsoid panicle; sepals and petals cinnamon-colour, with yellowish borders, oblong, crisped; lip yellow, remarkable for its retuse, retrorse, basal auricles, the reniform apex yellow, and the disk shining brown, with a very curious callus. Ecuador, 1870. An interesting and distinct species.

O. virgulatum (twiggy). A very curious species, with heteromorphous flowers, and very short, numerous, zigzag branches. Columbia, 1876. Of no ornamental value.

O. Warscewiczii (Warscewicz's).* *fl.* golden-yellow, numerous, disposed in racemes; lip having a white, five-toothed callosity, with four brown spots, and both borders of its narrow part being tinted with brown. *l.* cuneate-ligulate. Pseudo-bulbs ovoid, compressed, two-leaved. Costa Rica, 1870. SYN. *O. bifrons.* [C.]

O. Weltoni. *See* **Miltonia Warscewiczii.**

O. Wentworthianum (Earl Fitzwilliam's).* *fl.* pale lemon, barred towards the base of sepals, petals, and lip with Vandyke brown; lobes of lip large; panicles many-flowered, remaining in beauty about two months. Summer. *l.* linear, lanceolate, of a lustrous hue. Pseudo-bulbs oblong, ovate, pale green, mottled and barred with black. Guatemala, 1839. (L. & P. F. G. ii. 127.) [C.]

O. xanthodon (yellow-toothed). *fl.* very dark chocolate, with a very thin yellowish limb around both sepals and petals; lip dark brown, with a shining yellow crest and a yellow apex; spike very long, trailing, branched. Winter. *l.* long, linear-obovate, acute. Pseudo-bulbs narrow, ovoid, smooth, compressed, 5in. long. *h.* 2ft. Ecuador, 1868. (B. M. 5756.)

O. zebrinum (zebra-marked). *fl.* white, transversely barred with reddish-violet stripes; lip yellow; racemes very long, from 6ft. and upwards in length. Venezuela, 1872. A pretty species. (B. M. 6138; I. H. 274.)

ONCOCYCLUS. Included under **Iris** (which *see*).

ONCOSPERMA (from *onkos*, a tumour, and *sperma*, a seed; in reference to the form of the seeds). SYN. *Keppleria.* ORD. *Palmæ.* A genus comprising five or six species of spiny, stolon-bearing, stove Palms, natives of tropical Asia. Flowers unisexual, usually in threes; spadix shortly pedunculate; spathes two. Fruit small, round, one-seeded. Leaves terminal, equally pinnatisect, with very spiny, sheathing footstalks; segments ensiform, acuminate, entire. Trunks slender, spiny, marked with circular scars. The species thrive best in a compost of two parts loam, one of peat, and one of sand. They require a copious supply of water. Propagated by seeds, or by suckers. The species here described are probably the only ones yet introduced.

O. fasciculatum (fascicled). *l.* dark green, pinnate; pinnæ long, somewhat pendent; petioles sheathing, clothed with slender black spines. Ceylon. An elegant species.

O. filamentosum (thready). *l.* pinnate, from 10ft. to 12ft. long; pinnæ very numerous, narrow, drooping, about 2ft. long. *h.* 40ft. to 50ft. Malacca, &c. SYNS. *Areca Nibung* and *A. tigillaria.*

O. Van Houtteanum (Van Houtte's). A synonym of *Nephrosperma Van Houtteanum.*

ONIME ROOT. *See* **Plectranthus ternatus.**

ONION (*Allium Cepa*). There are few vegetable crops of greater importance, or more in daily request, than that

Onion—*continued.*

of the Onion. It is a native of Central Asia, &c. Until recently (comparatively speaking), the origin of the plant was unknown. It is a hardy biennial, as, although the leaves and roots are only of annual duration, the bulb formed in the summer, after being kept for a greater or less time, according as the different varieties admit, has the power of renewing its growth by forming fresh roots and leaves, and producing its flowers and seeds; afterwards, it dies away. Onions have been cultivated from the most remote period, throughout an extremely wide geographical area. Their uses are well and universally known, both in the green young state, and also, more especially, when the bulbs are matured. Much variation exists in the shape and flavour of bulbs belonging to different varieties; some being very mild and succulent, while others are pungent, almost, at times, to an intense degree. An Onion bulb is composed of a series of concentric coats, which surround its growing point, and vary in colour from dark red almost to white, the flavour being generally much stronger in the red than in the whiter-fleshed varieties. Propagation of the several sorts is readily effected by seeds, which, however, soon degenerate if care is not taken; in some cases, also, offsets are produced, and may be utilised as a method of increase.

CULTIVATION. One of the best and most open situations in the kitchen garden should be assigned to Onions, as such a position is indispensable for their successful cultivation. They succeed best in a rich, loamy soil, somewhat light rather than heavy, and where the subsoil is of a fairly dry nature. The suitability of a light or a heavy soil, however, depends a good deal on whether the summer is a wet or a dry one; and indifferent soils may be much improved by the addition of suitable manures, and by a system of intercropping, or changing of ground, so that different vegetables are not grown, if it can be avoided, in the same division of the garden two years in succession. For instance, Onions sown in spring could scarcely be better suited, as to position and soil, than by land occupied the previous year with Celery; autumn-sown ones might follow Potatoes, Peas, Beans, or any of the *Brassica* tribe; and thus a change of crop would be effected. Especially should this change be allowed in the case of Onions, when the produce becomes cankered in any one situation, or the plants are attacked by the destructive maggot of the Onion Fly. Land intended for Onions should be well-trenched in the autumn, and left in ridges for the winter fully exposed to the weather, which will wonderfully ameliorate and improve that of a firm texture, or heavy and adhesive nature, before the seed-sowing time arrives. Where a crop of Celery has been grown, trenching will scarcely be necessary; the deep digging and manuring requisite for Celery culture being sufficient to intermix and change the position of nearly the whole of the soil. A good dressing of manure should be applied at trenching time, or dug in at the same season, if trenching is unnecessary. A few words on the best manures. The scrapings obtained from poultry yards, or from pigeon-houses, have long been considered as excellent manures for adding to land intended for Onions. Sheep-dung and pig-dung, where either can be obtained, are also powerful and good. Mixed farmyard manure may be used in large quantities for a preceding crop, or else it should be well dug in during the autumn. Guano or blood should be mixed in a compost, if either are used; or the latter may be added to water, and applied in weak solutions as a liquid manure. Charred rubbish, wood ashes, and charcoal are beneficial in several ways; salt and soot are also excellent to sow with the seed, as, besides acting as a manure, they prevent, to a great extent, the attacks of insects.

Spring-sown Onions. Land exposed in ridges throughout the winter will be in excellent condition for levelling down about the middle or end of February, supposing

Onion—*continued.*

the weather is fine; it should not, however, be worked when in a wet state. The whole surface is best if lightly dug over with a spade or fork, and the soil thoroughly broken and levelled, so that raking will be unnecessary for securing a fairly uniform surface. If the soil is as dry as it should be, and moderately light, it may then be well trodden or rolled previous to preparing drills for the seed. Onions succeed and form the best bulbs on firm ground, and the seeds should be but lightly covered. A custom which was at one time in general practice, namely, that of sowing them in narrow beds, and cutting alleys between, is, apparently, fast becoming obsolete, and the crop cultivated in an open quarter instead. Shallow drills should be drawn 1ft. apart, and of as near as possible an even depth, the seeds scattered thinly along them, and lightly covered. The whole surface may then be trodden over again, in a direction at right angles to the lines of seed; or rough stones, &c., may be removed carefully with a wooden rake, and the bed afterwards rolled. Divisions may readily be made, if they are desired, and beds of any size formed, by omitting to sow a line at each of the given distances of so many feet width. It is important that the foregoing operations should only be performed in fine weather, and when the soil is in a workable condition. The principal sowing should be made as early as possible in the month of March as various circumstances and the weather permit; but, if frost, snow, or heavy rains prevail, it is best to defer the operation till the middle of the month. The after-treatment will chiefly consist in keeping weeds removed, and in thinning out the Onions gradually, when large enough, until they are from 3in. to 6in. apart; if extra-sized specimens are desired, a greater distance should be allowed at the final thinning. Deep hoeing, so beneficial to most kitchen garden crops, is not so to Onions, as the object with these is to keep the ground solid, so that the bulbs may be the more enlarged on its surface than they would be likely to become if surrounded with soil. Narrow hoes may be lightly used between the rows; but hand-weeding is best in the lines, and thinning of the crop should also preferably be done by hand. In very dry seasons, watering is at times advisable; but it should never be practised when the plants show signs of forming thick necks instead of their proper bulbs. The system of sowing in drills 1ft. apart has many advantages over the old method of scattering the seeds broadcast, as sufficient space is thereby afforded the plants on either side, and weeding, thinning, and all other necessary attention are much more readily bestowed. A little soot, applied thinly over an Onion bed with the hand in showery weather, is of material help to the crop when growing; to use it in dry weather would be unsafe, on account of its burning properties. Towards the latter part of summer, when the tops begin to bend down and show signs of dying away, it is time to pull up the bulbs. For this operation, advantage should be taken of dry weather, and the bulbs laid with their bases towards the sun, on a hard surface if possible, where they can be turned over occasionally and thoroughly dried before being stored. Different varieties are best kept and stored separate from each other, as their keeping qualities vary considerably. Those calculated to keep longest should especially be thoroughly ripened and dried. They are best tied up in bunches, and suspended to the rafters of a cool, dry, shed or loft where frost is merely excluded. If placed in a position exposed to heat, to much moisture, or even hung against the walls of a shed, new growth would be encouraged, and the bulbs would soon be useless in consequence. Where a large quantity of Onions are grown, and time cannot be spared for tying them up, they may be stored, several bulbs deep, in a similar place to that above recommended, and be encased with a covering of

Onion—*continued.*

clean, dry straw. Long-keeping varieties thus treated are sometimes preserved in good condition until late in spring.

Autumn-sown Onions. Onions may be sown in autumn for two purposes: first, for pickling or for drawing as required for use in spring; and, secondly, for the purpose of transplanting at the latter season. Spring-sown bulbs grow to a large size, under good cultivation, by the autumn; after they have been allowed a resting season, instead of further enlarging, they invariably tend to produce a flower-stem. But if seeds of a large-growing, early sort are sown thickly towards the latter part of summer, so that time is only allowed them to form very small bulbs, these may be stored and replanted in March, with the result that a large proportion, at least, will enlarge so as to form finer specimens the following year than could be secured in a similar soil and position, in one season from spring-sown seeds. Again, earlier and finer produce may be obtained by sowing in August or early in September, and transplanting in the new year so soon as weather permits. All varieties are about as hardy as each other; none are secure against a very severe winter, without being sown in a warm position or provided with some protection. The Tripoli or Italian Onions require a long season to ripen perfectly, and are, consequently, best sown in autumn; White or Silver-skinned varieties are also valuable for autumn sowing, as, under such treatment, they form useful bulbs early the following season. Any of the varieties that succeed well, when spring-sown, may also be considered equally good for autumn sowing. The ground should be prepared in a manner somewhat similar to that already detailed, but the seed drills should be made rather deeper, to guard against frost lifting out the plants in winter. In the process of transplanting, the roots should be preserved as much as possible. On a small scale, little trenches may be made, and the roots only inserted, leaving the plant above the surface; but where large quantities have to be transplanted, the dibber must be brought into requisition. A greater or less proportion of any autumn-sown Onions invariably run to seed, as might be expected from their natural habit of flowering the year after being sown. Spanish Onions, so largely imported into, and highly esteemed in, this country, are cultivated chiefly from seeds, sown thinly, in a warm situation, about November, protected with mats, &c., afterwards, and transplanted into rich soil about April. These varieties deteriorate under cultivation in this country, probably from being insufficiently hardy to withstand our climate.

Seed-sowing of Onions for Pickling. Silver-skinned varieties of Onion are preferred for pickling, on account of their flesh being nearly white, and of a better appearance than when coloured. Two-bladed—so named because of its peculiarity in only producing two blades or leaves—is a very small and an early variety most useful for pickling purposes. Seeds may be sown in early spring, and also in autumn, in a bed where the soil is poor rather than rich, the object being to get a large quantity of bulbs; the smaller they are, the better. The seeds should be scattered broadcast for pickling Onions, thickly, but, at the same time, as evenly as possible, and thinning-out will be unnecessary.

Seed-saving. Only specimens of a good shape and of large size, according to the variety, should be selected for seed-production. Varieties or forms soon deteriorate, if selection is not rigidly practised. Plant the bulbs in good soil, and in a sheltered position, early in February, and tie up the flower stalks as soon as they require support. When the seed vessels turn brown, and begin to burst, cut the heads, and dry them in the sun; or place in paper bags, and suspend them, head downwards,

Onion—*continued.*

from the roof of a dry, cool shed. The seeds keep fairly well for two years, but cannot be depended upon afterwards.

FUNGI. Onions, and their allies, Leeks, Chives, &c., are liable to be much injured by the growth on them of several kinds of parasitic Fungi, which belong to groups noted for the harm done by them to cultivated plants. Each group is described under the headings noted below; hence, we shall not give any full account of the species here, but shall refer our readers to those headings. All the Fungi bore into and through the tissues of the host-plants; hence, no external applications are of much use. The best thing to be done is, therefore, to remove and burn all the affected plants, in order to prevent the spread of the disease. The most hurtful species of Fungi on Onions are: (1) The Onion Brand (*Puccinia minta* = *P. Allii*), which produces yellow and brown patches of spores on the leaves and flower-stalks (*see* **Puccinia**); (2) the Onion Smut (*Urocystis cepulæ*), filling the bulbs with a black mass of spores (*see* **Urocystis**); (3) the Onion Mildew (*Peronospora Schleideniana*), which causes a whitish-grey bloom on all the young leaves, and fills all parts with its mycelium (*see* **Peronospora**); and (4) the Onion Mould (*Mucor subtilissimus*), which penetrates the tissues at the top of the bulb, and also of the bulb itself, and forms in them multitudes of small black bodies (sclerotia) like grains of gunpowder. These emit mycelial tubes in moisture; and, when the tubes reach the air, the branches form, at their tips, small bladders (sporangia), full of spores, which are set free by the bursting of the bladders.

SORTS. There are over twenty sorts of Onions which may be considered distinct, and forms of one or another of these are in some cases named as new kinds almost indefinitely. The majority answer equally well for sowing both in spring and autumn; but there are some that do not obtain a season sufficiently long to ripen them, unless sown in the autumn. Of these the Tripoli, or Italian, and Lisbon varieties are examples; the whole of the Silver-skinned section (except for pickling purposes), may also be sown in autumn with good results, as they form bulbs so early the following spring. Spring-sown Onions are, generally speaking, the most important as a crop, and the majority of cultivators who have not to maintain a continuous supply, limit their operations to the one season's growth. Produce of medium size, so long as it is solid and thoroughly ripened before being stored, is, as a rule, more useful for ordinary purposes than large specimens; size and shape are, however, most important conditions where exhibiting is practised.

Brown Globe. Bulbs of medium size, somewhat globular, with high crown and dark or reddish-brown skins. An excellent keeping variety, and one which is much esteemed. MAGNUM BONUM is a good form of this.

FIG. 734. DEEP BLOOD-RED ONIONS.

Deep Blood-red. Bulbs of medium size, or rather small, flattened, and generally of an even outline; the inner part is pure white, while the outer coats vary in colour from dull, to deep glossy, red. A very strong-flavoured, solid Onion, and an excellent keeper. See Fig. 734.

Onion—*continued.*

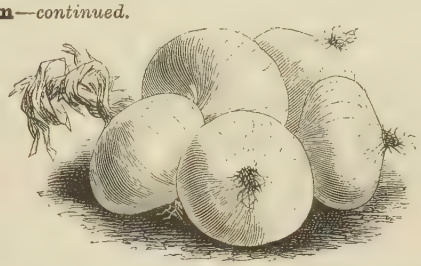


FIG. 735. EARLY WHITE NAPLES ONIONS.

Deptford. Bulbs medium, flattened or oblate, with a small neck; skin dark reddish-brown; flesh solid, tinged with red. A good keeping variety, of excellent quality; very hardy, and ripens early. SYN. Brown Spanish.

FIG. 736. JAMES'S KEEPING ONION.

Early White Naples. An early form of the Silver-skinned section, excellent for sowing in autumn, as it produces useful little bulbs early in spring. SYN. Early Nocera. See Fig. 735. PARIS SILVER-SKIN is very similar to this, but is somewhat later in forming bulbs. It does not keep long.

FIG. 737. NAPLES GIANT ROCCA ONION.

Flat Tripoli. Bulb large, roundish, with a thick neck; flesh reddish, soft, of mild and excellent quality, but soon decays after being stored. Should be sown in autumn.

Onion—*continued.*

Giant White Tripoli. Bulb large, flattened, with an irregular base; skin silvery-white; flesh greenish-white, of very mild flavour. Plant strong and robust, attaining a very large size, when sown in autumn and transplanted.

Globe Tripoli. Bulb globular, with a thick neck, very large; flesh white, mild, of excellent quality. Plant of strong growth. The varieties of Tripoli Onion are not good keepers, but are very useful in summer and early autumn.

James's Keeping. This is sometimes considered as a form or synonym of BROWN GLOBE. It is, however, well marked in most samples by being more of a pear-shape. One of the best and longest keeping varieties, and one much esteemed. See Fig. 736.

Lisbon. Bulb large, globular, with rather thick neck. Useful for spring salads, if sown in autumn, but not generally recommended.

Naples Giant Rocca. Bulb large, roundish, regular in outline; flesh white, thick, and of good quality. A desirable sort, of robust growth; ripens and keeps well. See Fig. 737.

FIG. 738. QUEEN ONIONS.

Queen. A small and very early variety of the Silver-skinned section, which forms bulbs very quickly, perhaps quicker than any other. Sown early in March, it is full grown by June; and it is also highly recommended for autumn sowing. The bulbs are small, but very firm and solid, and keep well; skin thin, silvery-white. The plant has rarely more than two or three leaves. SYN. New Queen. See Fig. 738.

Silver-skin. Much like PARIS SILVER-SKIN, or EARLY WHITE NAPLES. The bulbs ripen and keep well into the winter. This variety and all in the section are most desirable, and of greatest use for pickling.

FIG. 739. TREBONS ONIONS.

Trebons. Bulbs very large, obovate, tapering to the stalk or neck; flesh pale and rather soft, but of mild and excellent quality. A first-rate Onion, of fine appearance, resembling very closely the imported Spanish variety. It is one of the best for autumn sowing, and succeeds most favourably in warm seasons. See Fig. 739.

Two-bladed. The true two-leaved type has small roundish bulbs of a dull yellowish-brown colour; they are about 1in. in diameter, firm, ripen early, and keep well. Much grown for pickling on account of its small size.

Wethersfield Red. Bulbs large, flattened, or oblate, of even and regular outline; outer skin dull red or purplish; inner flesh pure white. A handsome American variety—perhaps the best of all the red Onions—of excellent quality, and good keeping properties.

FIG. 740. WHITE SPANISH ONIONS.

White Globe. Bulbs of medium size, globular or obovate, with a high crown. A much-esteemed, and good-keeping sort, similar in many respects to WHITE SPANISH, but of a different shape.

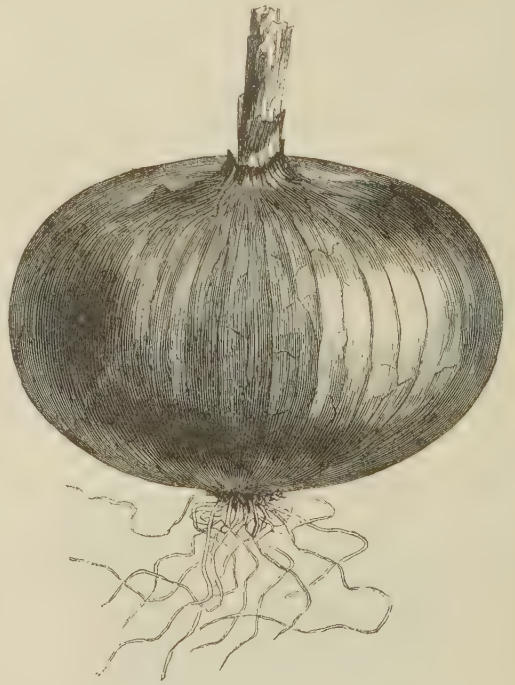


FIG. 741. YELLOW DANVERS ONION.

White Spanish. Bulbs large, flattened, base broad, and sometimes a little hollow and uneven; skin pale straw-colour, and falls off readily; flesh solid, almost white, and of first-rate quality. This is the type of Onion most largely cultivated. It generally keeps in good condition up till late in spring. See Fig. 740. Of the numerous forms, the following are recommended as being the best: ANGLO WHITE SPANISH, BANBURY, NUNEHAM PARK, READING, and ROUSHAM PARK HERO.

Onion—*continued.*

Yellow Danvers. Bulbs of medium size, with small base and fine slender neck; flesh very firm throughout, of fine quality. A fine and distinct variety, which ripens off freely and keeps well. See Fig. 741.

The following are varieties of Onion that are distinct in habit from those already enumerated. They are useful to grow in small quantities, as sometimes they come in when others are not procurable.

Egyptian, Tree, or Bulb-bearing Onion (GARDEN ROCAMBOLE). This throws up a stem from the bulb, which has to be planted, and produces a number of small bulbules, about the size of marbles, on the top, that are excellent for pickling. Offset bulbs are also formed underground; and from these, and the other small ones produced on the stem, the variety is propagated.

Perennial Tree or Top Onion. This is somewhat similar to the EGYPTIAN, but the bulbules are smaller, and none are produced underground. The plant is perennial, and has long, fibrous roots.

Potato or Underground Onion. A variety cultivated something like Shallots. Small bulbs are planted singly, and around them new ones are formed. They are of irregular shape, of fair quality, and useful for an early supply. This variety is not propagated from seeds.

Welsh Onion. This is a herbaceous perennial, with long, fibrous roots; it forms no bulbs. There are two varieties, the Red and the Green, cultivated for the use of their tops, or leaves. Propagated by seeds, or by division of the roots.

ONION FLY (*Anthomyia Phorbia ceparum*). This insect is at times most hurtful to Onions, the larvæ burrowing into, and eating, the bulb scales, near the base, in companies of from two or three to one hundred, or even more. These attacks are very serious in some localities, the greater part of the crop being often severely injured. The bases of the thick leaf-scales rot, and the plants are easily pulled up, leaving the decaying bulb and the maggots in the soil.

The flies are not unlike common house-flies in general appearance. They are of a blackish colour, thickly powdered with grey; the sides of the thorax are pale, and there are three dark lines on the back. In certain lights, the abdomen has a whitish lustre on it, with, in the male, a darker median stripe. The eyes are separated, in the

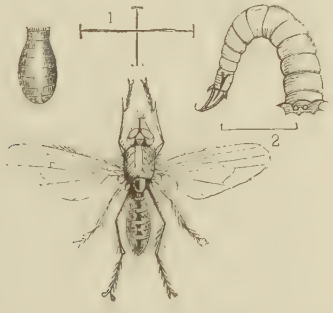


FIG. 742. ONION FLY, LARVA, AND PUPA.

1, Lines showing Natural Spread of Wings and Length of Body of the Fly; 2, Line showing Natural Length of Larva.

male, by a slender, black, white-bordered line; the face has a pale lustre, and the forehead is black, as are the antennæ and palpi; the legs are pitch black, the wings being pale grey, and the poisers white. The length of the insect is about ¼in. In the female, the forehead is broad, with a reddish-brown, vertical median stripe, and the body is more ochreous in colour than in the male.

Life History. The flies emerge, in early summer, from the brown pupæ, which have remained all winter underground, sometimes in the Onion, but usually near it in the soil. The female generally lays her eggs, five or six on each plant, on the leaves, just above the soil; and from these emerge larvæ, which bore downwards in the soil, and into the leaf bases, causing the whole Onion ultimately to rot under their attacks. They are nearly

Onion Fly—*continued.*

white, with yellow stigmas, smooth and shining, tapering (but headless) in front, and blunt behind. When full-fed, they burrow into the soil, and there become changed into chestnut-brown wrinkled pupæ. The fly, larva, and pupa, are shown in Fig. 742, and a diseased bulb in

FIG. 743. SECTION OF ONION ATTACKED BY LARVÆ OF ONION FLY.

a, a, Groups of Eggs and Young Larvæ; *b*, Hole made by Larva in Entering the Bulb; *c*, Direction of Course followed by Newly-hatched Larva to reach Base of Bulb; *d*, Burrow of Larva, in Bulb, with Larva lying in it.

Fig. 743. The entire development occupies from four to six weeks, so that several broods may appear in a summer. The first sign of attack by the larvæ is that the outer leaves become yellow, and fall, withered. The habitat in the bulbs protects the larvæ from injury, and from direct means of destroying them, unless the Onions are destroyed.

Remedies. Prevention is better than cure; and, for the safety of future crops, it is well to dig up and remove any plants that show signs of turning yellow, especially where the flies have been observed. The diseased bulbs should be dug out carefully; and they, and any larvæ that creep out, should be destroyed. If this is done sufficiently early, all the larvæ should be got rid of; but if deferred, they will have left the bulbs, and have turned into pupæ in the soil, in which situation they are less easily reached. Deep trenching of the soil in autumn is of use to destroy the pupæ, and farmyard manure, dug in during the operation, strengthens the plants. Applications of soot or gypsum, and of gas-lime, to the soil have been found useful; as have also soapsuds, and water from pigstyes, and, best of all, the use of paraffin oil, in the proportion of about 1oz. or 2oz. to a gallon of water. Sulphuric acid has been recommended, but is hardly suitable, as it is dangerous to the plants. Scattering the plants in small groups among other crops hinders the passage of larvæ from plant to plant.

ONISCIDÆ. A family of *Crustacea*, popularly known as Woodlice, or Slaters. The *Crustacea* include a large number of animals, which, like insects, have the body jointed, or forming rings of hard substance, to protect

Oniscidæ—*continued.*

the soft internal organs; these rings are united by soft membranes, to permit of the motion of one ring or another. They resemble insects considerably in the structure of the mouth, antennæ, and limbs; but they are readily distinguished from insects by possessing more than three pairs of true jointed legs, and by breathing by gills instead of by air-tubes. They never have a trace of wings; and their general appearance is an easy means of recognising them. They have two pairs of antennæ, though, in *Oniscidæ*, one pair is hardly to be seen. Their course of development also, and the changes passed through, are different from those undergone by insects. The class *Crustacea* includes a number of families of very different appearance, size, and habits; but most of its members live in water, and those which live out of water prefer moist situations, such as among dead leaves and other decaying matter, and conceal themselves, accordingly, during the day, in holes, from which they emerge, to feed, at night. The larger *Crustacea*, or *Podophthalma*, have their eyes supported on stalks. To this series belong crabs, lobsters, shrimps, and allied forms. By far the greater number of species of *Crustacea*, however, are small, with the eyes sessile, *i.e.*, upon the surface of the head, not on footstalks. The individuals of several of the groups in this series are microscopic in size; but two groups contain species of ⅛in. and upwards in length, having the head and segments of the body all distinct, with the body segments all alike in general form and possessing fourteen pairs of legs. Of these two groups, one, called *Amphipoda*, has the front pairs of legs different from the hinder ones. The other group, called *Isopoda* (meaning equal feet), has the legs all similar, and possesses certain appendages at the hinder end of the body connected with breathing. To this group belong the *Oniscidæ*.

The *Oniscidæ* are distinguished from the remaining *Isopoda* by their habit of living in damp air instead of in water; by the organs for breathing being modified into functional lungs, instead of being fitted to obtain oxygen from water; and by having only one pair of antennæ well developed, and the legs fitted only for walking or crawling. They are mostly oblong or oval in general outline, and much depressed, with broad, short segments on the back, nearly hiding the rather short legs; but the antennæ are distinctly seen, projecting from the sides of the head. The females carry the eggs and young, for a time, in a kind of pouch on the lower surface of the body. The young differ from the old animals only in the smaller number of body rings and legs. The *Oniscidæ* are mostly sluggish, and live, during the day, in holes or other places of concealment. In colour, they are usually greyish-brown or dark slaty-blue, sometimes spotted with yellowish or buff markings on the back. They are common in damp, dark places, *e.g.*, under stones and dead leaves, in holes in walls or trees, in flower-pots, in cellars, &c., frequently crowded together in large numbers. They feed on plants, usually preferring decayed parts, but often do injury to delicate flowers (*e.g.*, Orchids), and frequently eat down seedlings, or destroy plants that spread their leaves on the soil, by eating into the part where root and stem meet. They are injurious to fruit-trees growing on walls, by eating into the ripe fruit that can be reached from the wall; and, in like manner, they eat into fallen fruits. It may be observed, that they are the only *Crustacea* at all hurtful in gardens. The most troublesome species are three, nearly the same size, viz., about ½in. long on an average. These three are *Oniscus asellus*, with eight-jointed antennæ, back nearly smooth, light greyish-brown or leaden-blue, with two rows of yellowish or buff spots near the sides, and others scattered over the middle space of the back; *Porcellio scaber*, with seven-jointed antennæ, back covered with

Oniscidæ—*continued.*

round, raised tubercles, dark grey or slaty-blue, and often spotted as in the last but varying considerably in colour; and *Armadillo vulgaris*, easily known by its form being longer, and more convex, with the sides nearly parallel; by the absence of projecting appendages at the tail; by its seven-jointed antennæ, and uniformly dark leaden colour; but, above all, by its habit of rolling itself up into a ball when alarmed. This habit has gained for it the name of Pill Millipede, and, probably, was the ground on which it was, in past times, employed as a medicine, to be swallowed as a pill. It was much praised as an effective remedy in a number of ailments, but has fallen out of repute. *Oniscus asellus* was also at one time used as a remedy for ague, consumption, and other diseases; but it also has been discarded.

Prevention. All holes and coverts ought to be to the utmost got rid of, to prevent the Woodlice from finding shelter in the neighbourhood of the plants that have to be protected. Further security may be obtained by putting the pots on stands in water, or suspending them; or, in some cases, by covering them with glass. Trees may be protected by closing all holes in walls, removing loose plaster, and putting a strip of tar, or other adhesive substance, along the base of the wall, and on the trunks of the trees.

Remedies. When plants are injured, the cause should be sought for, and the animals destroyed. Traps may be used successfully, such as slices of fruits or fleshy vegetables, laid in favourite retreats; or hollow stems, and other shelters, placed in the localities frequented by such animals. Such traps should be examined from time to time, and the Woodlice found therein destroyed by being crushed, or dropped into boiling water.

ONISCUS. *See* **Oniscidæ.**

ONOBROMA, of De Candolle. Included under *Carthamus.*

ONOBROMA, of Gaertner. A synonym of **Carduncellus** (which *see*).

ONOBRYCHIS (the old Greek name used by Dioscorides, derived from *onos*, the ass, and *brycho*, to bray; said to be the favourite food of the ass, who brayed in his eagerness to get at it). Saintfoin. ORD. *Leguminosæ.* A rather large genus of greenhouse or hardy, unarmed herbs or sub-shrubs, or rarely very spiny small shrubs. Upwards of seventy species have been described, not more than fifty of which are really distinct as such; they inhabit Europe, North Africa, and extra-tropical, mostly Western, Asia. Flowers purplish, pink, or white, disposed in axillary pedunculate spikes or racemes. Pods compressed, semi-orbiculate or orbiculate-circinate. Leaves impari-pinnate; leaflets entire, exstipellate. The plants are of easy culture in a deep sandy-loam soil. Seeds should be sown, in spring, in their permanent quarters. The only species calling for mention here are the following; they are hardy perennial herbs.

O. Caput-galli (cock's-head). *fl.* flesh-colour, in few-flowered spikes. July. Pod slightly pubescent. *l.* oblong or cuneate-obovate, mucronate, pubescent. Stem erect or diffuse. *h.* 1½ft. South Europe, 1731. (S. F. G. 723, under name of *Hedysarum Caput-galli.*)

O. radiata (rayed). *fl.* yellowish-white, lined with red, and spotted with yellow on the standard; calyx (and pod) villous; spikes cylindrical. June. *l.* ovate, obtuse, mucronate, hairy beneath. Stem erect, softly hispid. *h.* 1½ft. Iberia, 1818. (B. R. 1847, 37.)

O. sativa (cultivated). Common Saintfoin. *fl.* variegated, on elongated spikes. Summer. Pod pubescent. *l.*, leaflets elliptic-oblong, mucronate. Stem erect. *h.* 2ft. to 3ft. West and South Europe (Britain), North Asia. (J. F. A. 352; Sy. En. B. 381.)

O. s. montana (mountain). *fl.* purplish-rose, on short spikes; keel longer than the vexillum. Summer. Pod denticulate at back. *l.* cuneate-lanceolate, mucronulate. Alps of Europe, 1817. A very pretty and rather decumbent-growing rock plant.

ONOCLEA (changed from the Greek name of a plant, *Onokleion*, or from *onos*, a vessel, and *kleio*, to close; alluding to the singularly rolled-up fructification). Including *Struthiopteris*. ORD. *Filices*. A small genus (three species) of hardy Ferns, inhabiting cold and temperate regions. Sori dorsal, globose, on the veins of the changed and contracted pinnæ of the fertile fronds, and quite concealed by their revolute margins; involucre very thin, delicate-membranous, hemispherical or half cup-shaped, originating from the inferior side of the sorus, or wanting. The species thrive best in a good, strong, loamy soil, and are very suitable for the outdoor fernery. For general culture, *see* **Ferns.**

O. germanica (German).* Ostrich Fern. *fronds* broad-lanceolate, long-attenuated at the base; fertile pinnæ short, much contracted, linear-terete, torulose, lobed and torn at the margin; involucre cup-shaped, very fragile, and soon obsolete. Northern hemisphere. A handsome species. SYNS. *Struthiopteris germanica, S. pennsylvanica.*

O. orientalis (Eastern). *fronds* ovate-oblong, not attenuated at the base; fertile ones oblong, often 2ft. long, contracted; pinnæ linear-oblong, flattened, two-edged, the broad, refracted margins covering the whole back, dark purple-brown, glossy, at length spreading, torn at the margin. Sikkim, Japan. SYN. *Struthiopteris orientalis.*

O. sensibilis (sensitive).* Rootstock extensively creeping. *fertile fronds* bipinnate; pinnules recurvate, globose. *sterile fronds* rising separately from the naked rootstock, long-stalked, broadly triangular in outline, deeply pinnatifid into lanceolateo-blong pinnæ, which are entire or wavy-toothed; involucre a globose pellicle, bursting at the summit. North America, North Asia, 1799.

O. s. obtusilobata (obtuse-lobed). A rare abnormal form, in which the pinnæ of some of the sterile fronds, becoming again pinnatifid, and more or less contracted, bear some fruit-dots without being much revolute, or losing their foliaceous character. Pennsylvania.

ONONIS (the old Greek name used by Theophrastus). Rest Harrow. ORD. *Leguminosæ*. An extensive genus (about sixty species) of glabrous, pubescent, or villous, greenhouse or hardy, annual, biennial, or perennial herbs, sub-shrubs, or rarely shrubs, inhabiting Europe, Western Asia, and North Africa, and extending to the Canary Islands. In the British Flora, the genus is represented by the variable *O. spinosa*, an under-shrub, and *O. reclinata*, a low-growing annual. Flowers pink, yellow, or white, in axillary, solitary, or two or three-flowered, racemose peduncles, or sessile. Pod oblong or linear, two-valved. Leaves usually pinnately trifoliolate; stipules adnate to the petioles. Several species are of easy culture in any ordinary garden soil, and are very suitable subjects for growing on banks and rockwork. Propagated by seeds, or by divisions. The species here described are those best known to cultivation.

O. aragonensis (Arragon).* *fl.* yellow, almost sessile, twin, disposed in a leafless raceme; calyx half as long as the corolla. May to July. *l.* trifoliolate, glabrous; leaflets roundish, serrated. *h.* 1ft. to 2ft. Spain, Arragon, &c., 1816. Half-hardy shrub.

O. fruticosa (shrubby). *fl.* purple; peduncles three-flowered, disposed in a raceme. Summer. *l.* trifoliolate; leaflets sessile, smooth, lanceolate, shining, unequally serrated. *h.* 1ft. to 2ft. South-western Europe, 1680. A handsome, low-growing, hardy shrub. (B. M. 317.)

O. hispanica (Spanish). *fl.* yellow; pedicels one-flowered. July. *l.* trifoliolate; leaflets nearly round, undulate, toothed, clammy-pubescent; stipules spreading, deflexed. *h.* 1½ft. Spain, 1799. Half-hardy shrub. (B. M. 2450.)

O. minutissima (very small). *fl.* yellow, in leafy, aggregate spikes; corolla shorter than the calyx. June. *l.* trifoliolate; leaflets oblong, obovate-cuneate, serrated; stipules subulate, entire. *h.* 3in. South-west Europe, 1818. A somewhat tufted hardy biennial. (J. F. A. 240.)

Ononis—*continued.*

O. Natrix (goat-root).* *fl.* yellow, veined with red; pedicels one-flowered, each furnished with an awn. Summer. *l.* alternate, trifoliolate; leaflets oblong, serrated at the apex, the upper ones sometimes simple. *h.* 1½ft. to 2ft. South Europe, 1683. Hardy perennial herb, clothed with a clammy pubescence. (B. M. 329.)

O. peduncularis (peduncular). *fl.*, petals white, with pink margins; peduncles thrice as long as the leaves, slender, glandular-pubescent. April. *l.* simple, obovate, dentate, pubescent, patent or recurved. *h.* 1ft. Teneriffe, 1829. Tender perennial herb. (B. R. 1447.)

FIG. 744. ONONIS ROTUNDIFOLIA, showing Habit and detached Single Flower.

O. rotundifolia (round-leaved).* *fl.* rose; peduncles three-flowered, bractless. Summer. *l.* trifoliolate; leaflets obovate, roundish, toothed. *h.* 1ft. to 1½ft. South Europe, 1570. A very handsome and most desirable, somewhat shrubby, hardy species. See Fig. 744. (B. M. 335.)

O. viscosa (clammy). *fl.* yellow, the back of the standard striped with purple, numerously disposed in panicled spikes. Summer. *l.*, lower ones trifoliolate, upper ones simple. *h.* 1½ft. to 3ft. South Europe, 1759. A handsome, hardy annual. (S. F. G. 678.)

ONOPORDON (the old Greek name, said by Pliny to be derived from *onos*, an ass, and *pordon*, crepitus; on account of its effect upon the asses who eat it). Sometimes spelt *Onopordum*. Cotton Thistle. ORD. *Compositæ*. A genus comprising about a dozen species of hardy annual, biennial, or perennial herbs, sometimes tall and branched, with decurrent, winged stems, sometimes almost stemless. They are natives of Europe, North Africa, and Western Asia. Flower-heads purplish, violet, or white, large; involucre globose or broad; receptacle flat, fleshy; achenes glabrous. Leaves radical or alternate, pinnatifid or sinuate-toothed. Two or three species of this genus are grown for their stately habit, and large and showy flowers. They will generally thrive in almost any ordinary garden soil, and are more especially adapted for the rougher parts of the sub-tropical garden. Seeds should be sown, in moderately good and well-drained soil, in early spring.

O. Acanthium (Acanthium).* Common Cotton Thistle. *fl.-heads* purple, large; scales of the calyx subulate, spreading in every direction. July. *l.* oblong, inclining to ovate, woolly on both sides. Stem branched, woolly. *h.* 4ft. to 5ft. Europe (Britain), Siberia. A very handsome perennial, with a bold habit and vigorous growth. (F. D. 909; Sy. En. B. 680.)

O. arabicum (Arabian). *fl.-heads* purple. *l.* having both sides covered with a white down. Stem also woolly, slightly branching, erect. *h.* 8ft. South Europe, 1686. Biennial. (B. M. 3299.)

Onopordon—*continued.*

O. elongatum (elongated). A synonym of *O. illyricum.*

O. illyricum (Illyrian). *fl.-heads* purple. July. *l.* decurrent, narrow-oblong-lanceolate, spiny-toothed, uppermost ones very short. *h.* 6ft. South Europe, 1640. A fine biennial species, with the general appearance of *O. Acanthium*, but having greener, more deeply-cut, and more spiny leaves, stiffer stem, and a more branching habit. SYN. *O. elongatum.*

O. macracanthum (long-spined). *fl.-heads* purple; involucre somewhat tomentose. July. *l.* decurrent, narrow-oblong-lanceolate, acuminate, spiny-toothed, glabrous above, cobwebby beneath. Stem erect, branched at apex, cobwebby. *h.* 6ft. Barbary, 1798. Annual. (S. F. G. 832.)

ONOPORDUM. *See* **Onopordon.**

ONOSERIS (from *onos*, an ass, and *Seris*, Endive; a salad for asses). Including *Centroclinium* and *Chætachlæna.* ORD. *Compositæ.* A genus comprising about a dozen species of stove, greenhouse, or hardy, annual or perennial herbs, or shrubs, of variable habit, natives of the Andes or extra-tropical South America, one being Brazilian. Flower-heads purple, pink, or white, large, solitary or paniculate, on long peduncles or scapes; involucre hemispherical or turbinate; receptacle naked or pilose-fibrillose. Leaves radical or alternate, white-tomentose beneath. The species succeed in a light vegetable soil. Propagation is effected by means of seeds. Probably the species here described are the only ones yet introduced to cultivation.

O. adpressa (adpressed). *fl.-heads* large, fragrant; ray and disk similar to those of *O. reflexa.* June to December. *l.* numerous, spreading, reflexed, 3in. or more long, lanceolate, waved, and nearly entire, pure white and cottony beneath. Stem shrubby, 1ft. to 2ft. high; branches white, woolly. Peru, 1830. Stove shrub. (B. M. 3115, under name of *Centroclinium adpressum.*)

O. Drakeana (Drake's).* *fl.-heads* bright purple, long-stalked. *l.* cordate-ovate, petiolate, white-tomentose beneath. New Grenada, 1883. Greenhouse, shrubby perennial. (R. H. 1883, 180.)

O. reflexa (reflexed). *fl.-heads* large, handsome, fragrant; ray-florets nine to twelve, rose-purple, two-lipped, three-toothed; disk deep yellow, very prominent; peduncles solitary. Late autumn. *l.* spreading, 2in. to 3in. long, ovate-lanceolate, acute, coarsely toothed, gradually tapering to a petiole, woolly beneath. *h.* 1½ft. to 2ft. Peru, 1830. Stove annual. (B. M. 3114, under name of *Centroclinium reflexum.*)

ONOSMA (from *onos*, an ass, and *osme*, smell; said to be grateful to that animal). Golden Drop. Including *Maharanga.* ORD. *Boragineæ.* A rather large genus (about seventy species, of which, probably, not more than four have been introduced) of hardy, hairy or villous, annual, biennial, or perennial herbs, or sub-shrubs, inhabiting South Europe, North Africa, and West and Central Asia. Flowers yellow, rarely white or purplish, pedicellate or sub-sessile, in simple unilateral racemes or branched cymes; corolla tubular, five-lobed. Leaves alternate. The species thrive in a good deep soil, preferably sandy loam. *O. stellulatum*, and its variety *tauricum*, are the best; they should be grown in a well-drained, sunny part of the rockery. Of the perennial species, cuttings should be taken during summer; they may be rooted quickly, if placed in a close frame, and kept shaded for ten or twelve days; water should be given carefully, or the hairy leaves will rot off. The young stock should be well rooted and hardened off before the cold weather sets in. *O. echioides* requires similar treatment to the foregoing, but, being a biennial, it must be raised from seed each year. The annuals must be sown, in the open border, in April.

Onosma—*continued.*

O. echioides (Echium-like). *fl.* pale yellow, drooping, pedicellate, in terminal, conjugate racemes. May. *l.* spathulate-lanceolate; floral ones, or bracts, ovate-cordate. Stem much branched. *h.* 1ft. to 1½ft. South Europe, 1683. Tubercularly hispid or strigose, biennial herb. (S. F. G. 172.)

O. simplicissimum (very simple). *fl.* pale yellow, in few-flowered, terminal racemes; corolla ventricose, inflated at apex, three times as long as the calyx. April. *l.* sessile, linear, slightly acute, somewhat silky-canescent beneath. Stem erect, very simple. *h.* 1ft. Siberia, 1768. Perennial herb. (B. M. 2248.)

O. stellulatum (small star-like). *fl.*, corolla white, yellow, or citron colour, two or three times longer than the calyx. April. *l.* straight, linear-oblong, flat, or with revolute margins; radical and lower ones sub-spathulate, obtuse; upper ones lanceolate, acute, sometimes semi-amplexicaul. *h.* 6in. Macedonia, &c., 1819. Plant suffrutescent at base.

FIG. 745. ONOSMA STELLULATUM TAURICUM, showing Habit and detached Single Flower.

O. s. tauricum (Taurian).* *fl.* yellow, about 1½in. long, disposed in branched, secund heads. Summer. *l.* linear-lanceolate, acute, hispid, with revolute edges. Stems branched. *h.* 6in. to 8in. Caucasus, 1801. Perennial. See Fig. 745. (B. M. 889.)

ONOSMODIUM (so called from its similarity to *Onosma*). SYNS. *Osmodium*, *Purshia* (of Sprengel). ORD. *Boragineæ.* A small genus (about six species) of hardy, erect, herbaceous perennials, closely allied to *Onosma*, natives of North America and Mexico. Flowers white, greenish, or yellowish, sub-sessile, in terminal, scorpioid cymes or racemes; corolla tubular, with five erect or connivent lobes. Leaves alternate. The two species here described are the only ones yet introduced. For culture, *see* **Onosma.**

O. carolinianum (Carolinian). *fl.* yellowish-white, nearly sessile; racemes short, revolute, terminal, drooping. Summer. *l.* ovate-lanceolate and oblong-lanceolate, acute. *h.* 1ft. United States, 1759.

O. virginianum (Virginian). *fl.* yellowish, often paniculate. Summer. *l.* narrowly oblong, or somewhat lanceolate, obtuse, three to five-ribbed. *h.* 1ft. United States, 1812. Plant clothed with short, appressed, bristly hairs.

ONYCHIUM (from *onyx*, *onychos*, a claw; referring to the shape of the lobes of the fronds). ORD. *Filices.* A small genus (four species) of very beautiful, stove or nearly hardy Ferns, natives of Arabia, India, Cuba, Japan, &c. Sori placed upon a continuous linear receptacle, which connects the apices of several veins; involucre parallel with the margin of the segments,

Onychium—*continued.*

linear, opposite, pressed down over the sori, the edge nearly or quite reaching the midrib. Only two species have been introduced; both thrive in a compost of peat, loam, and sand. For general culture, *see* **Ferns.**

O. auratum (golden).* *sti.* 6in. to 12in. long, stout, erect, naked. *fronds* 1ft. or more long, 6in. broad, ovate, quadripinnatifid; lower pinnæ 4in. to 6in. long, sub-deltoid, erecto-patent; pinnules and segments numerous, usually deltoid; ultimate divisions of the sterile frond often obovate-cuneate, trifid at the apex, not more than one line long, coriaceous in texture; those of the fertile frond pod-like. Rachis and both surfaces naked; the membranous involucres and copious sori a rich golden-yellow. Himalayas. Stove.

O. capense (Cape). A garden synonym of *O. japonicum.*

O. japonicum (Japanese).* *sti.* 6in. to 12in. long, stout, erect, naked. *fronds* 1ft. or more long, 6in. broad, ovate, quadripinnatifid; lower pinnæ 4in. to 6in. long, lanceolate-deltoid; pinnules and segments numerous, usually deltoid, the copious, linear-mucronate, ultimate divisions one and a-half to two lines long, nearly uniform in the barren and fertile fronds. *sori* brown. Japan, China, &c. Greenhouse or nearly hardy. SYNS. *O. capense, O. lucidum.*

O. lucidum (shining). A synonym of *O. japonicum.*

OPAQUE. Dull; the reverse of shining. In botany, the term does not mean the reverse of transparent.

OPERA GIRLS. *See* **Mantisia saltatoria.**

OPERCULARIA (from *operculum*, a lid; referring to the shape of the calyx). ORD. *Rubiaceæ.* A genus comprising fourteen species of Australian greenhouse herbs or sub-shrubs, sometimes twining, glabrous or hispid-pilose, often fœtid. Flower-heads white, small, terminal, or rising from the forks of the branches, involucrate; peduncles erect or recurved. Leaves opposite, linear or oblong; stipules connate with the petioles. The species (of which two only are seen in cultivation) thrive in a compost of sandy loam, a little fibry peat, dried pieces of leaf mould, and a few pieces of charcoal. Propagation may be effected by seeds, sown in spring, on a mild hotbed; by cuttings of young shoots, several inches long; or by division, as growth commences.

O. aspera (rough). *fl.-heads* globular, compound, on short, recurved peduncles. June. *l.* shortly petiolate, ovate or lanceolate, scabrous above, glabrous or pubescent beneath, mostly ¼in. to 1½in. long, variable. *h.* 1ft. 1790. Sub-shrub. SYN. *O. ocymifolia.*

O. hispida (hispid). *fl.-heads* on short, recurved peduncles, smaller than in *O. aspera.* July. *l.* petiolate, ovate or lanceolate, either very hirsute and scarcely scabrous, or very scabrous, mostly about ¼in. long. *h.* 1ft. 1790. Sub-shrub.

O. ocymifolia (Basil-leaved). A synonym of *O. aspera.*

OPERCULATE. Covered with a lid.

OPHELIA. A synonym of **Swertia** (which *see*).

OPHELUS. A synonym of *Adansonia.*

OPHIOCAULON (from *ophis*, a serpent, and *kaulon*, a stem; in reference to its climbing habit). ORD. *Passifloreæ.* A small genus (three or four species) of stove, climbing, herbaceous, very glabrous shrubs, natives of tropical Africa, Natal, and Madagascar. They are allied to *Modecca*, but have a deeply five-parted calyx, obscure corona, and sessile stigma. The undermentioned, the only species in cultivation, thrives in well-drained sandy loam and leaf mould, and does best when planted out in a border inside the house, and its shoots trained near the glass. Care must be taken to guard against excess of moisture, particularly during the dull winter months. For propagation, *see* **Passiflora.**

Ophiocaulon—*continued.*

O. cissampeloides (Cissampelos-like). *fl.*, male ones numerous, in stalked, terminal, and axillary, trichotomously divided, many-flowered cymes. *l.* orbicular or cordate, glaucous, marked with black dots beneath, deep green, often mottled with white above, 2in. to 3in. long. Branches slender, cylindrical. West tropical Africa, 1869. SYN. *Passiflora marmorata*, of gardens. (G. C. 1871, 234.)

OPHIODERMA. Included under **Ophioglossum** (which *see*).

OPHIOGLOSSACEÆ. A sub-order of Ferns, characterised by the capsules being deeply two-valved, and opening down the side nearly to the base without a ring. There are three genera—*Botrychium, Helminthostachys*, and *Ophioglossum* — and about a score species.

FIG. 746. OPHIOGLOSSUM VULGATUM, showing Creeping Rhizome, and Barren and Fertile Fronds.

OPHIOGLOSSUM (from *ophios*, a snake, and *glossa*, a tongue; referring to the shape of the spike of fructification). Adder's Tongue. Including *Cheiroglossa* and *Ophioderma.* ORD. *Filices.* A small genus (about ten species) of pretty, stove, greenhouse, or hardy Ferns. Sporangia sessile, arranged in two rows, so as to form a flattened spike, which forms a branch of the barren frond, or is entirely distinct from it. About five species have been introduced. For general culture, *see* **Ferns.**

O. bulbosum (bulbous). Rootstock tuberous. *fronds* 2in. to 4in. long, the sterile division placed considerably below the middle, ¼in. to 1in. long, ½in. broad. *fertile spike* ½in. to ½in. long peduncle 1½in. to 2in. long when fully developed. North America, &c. Half-hardy.

Ophioglossum—*continued.*

O. lusitanicum (Portuguese). Rootstock slightly tuberous. *fronds* 1in. to 3in. long, the sterile division placed below the centre, ¼in. to 1in. long, about ⅛in. broad, linear-lanceolate, the point bluntish, the base narrowed. *fertile spike* ¼in. to ½in. long; peduncle firm, ½in. to 1¼in. long when mature. Mediterranean region, &c., 1816. Hardy.

O. palmatum (Palm-like). *sti.* 6in. to 12in. long, fleshy, flaccid. *fronds* like the letter V, 6in. to 12in. long, 4in. to 8in. broad, more or less cut from the circumference towards the centre into deep, blunt lobes. *fertile spikes* two to twelve, 1in. to 2in. long, arising from the stem or edge on the lower part of the frond, on short, nodding or spreading peduncles. Cuba, &c. Stove.

O. pendulum (pendulous). *fronds* pendulous, ribbon-like, without a distinct stem, 1ft. to 15ft. long, 1in. to 3in. broad, simple or forked. *fertile spike* usually low down, 2in. to 6in. long, on a peduncle shorter than itself, usually solitary. Polynesian Isles, &c. Stove. (H. G. F. 33.) *O. furcatum* is probably a variety of this species.

O. reticulatum (netted). Rootstock not tuberous. *fronds* 6in. to 12in. long, the sterile division placed about the middle, 2in. to 3in. long, 1½in. to 2in. broad, with a distinct haft and distinctly cordate basal lobes; veins distinct. *fertile spike* 1in. or more long, on a slender peduncle 2in. to 4in. long, much overtopping the sterile segment. Tropical America, 1793. Stove.

O. scandens (climbing). A synonym of *Lygodium scandens.*

O. vulgatum (common). Common Adder's Tongue. Rootstock not tuberous. *fronds* 6in. to 9in. long, the sterile division generally placed about the middle, 2in. to 4in. long, ¾in. to 2in. broad, ovate or ovate-oblong, without a distinct haft. *fertile spike* 1in. or more long, upon a peduncle 2in. to 4in. long, and considerably overtopping the sterile division when the plant is fully mature. Britain, &c. See Fig. 746.

FIG. 747. OPHIOGLOSSUM VULGATUM AMBIGUUM.

O. v. ambiguum (ambiguous). A smaller form, with linear-oblong blade, and a spike 1in. to 2in. in length. Orkney, Wales, &c. See Fig. 747.

O. v. pedunculosum (pedunculose). *fronds*, barren division like that of the type in form and size, but thinner in texture, and with a distinct haft. India, &c. Stove.

OPHIOPOGON (from *ophis*, a serpent, and *pogon*, a beard; a translation of the native Japanese name). Snake's Beard. SYNS. *Chloopsis*, *Flueggia* (sometimes spelt *Fluggea*), *Slateria*. ORD. *Hæmodoraceæ*. A small genus (four species) of hardy or half-hardy, perennial herbs, found in the East Indies and Eastern Asia as far as Japan. Flowers numerous, simply racemose; perianth white, or tinged with lilac, the tube obconical and adnate to the ovary; segments six; pedicels articulated, often aggregated. Leaves usually sessile, linear. The species are interesting and curious rather than pretty. They thrive best in a sandy soil. Propagated by divisions, in spring.

O. Jaburan (Jaburan). *fl.*, perianth white, or tinged with lilac; raceme sub-secund, rather dense, 3in. to 6in. long; scape 6in. to 2ft. long. July. *l.* 1½ft. to 3ft. long, ½in. broad, sometimes

Ophiopogon—*continued.*

variegated with white. Japan, 1830. Habit similar to *O. japonicus*, but more robust. (L. B. C. 1826.)

O. J. variegatus (variegated).* *fl.* deep violet-blue, freely produced in dense spikes. Berries deep blue, about the size of currants. *l.* linear-lanceolate, striped with green and creamy-white. Japan, 1865.

O. japonicus (Japanese).* *fl.*, perianth white; raceme loose, few-flowered, sub-secund, 2in. to 3in. long; scape 2in. to 4in. long, naked, angular. June. *l.* radical, erect, narrow-linear, nearly, or quite, 1ft. long, about ¼in. broad. Japan, 1784. (B. M. 1063.)

O. j. intermedius (intermediate).* *fl.* lilac, small, numerous; raceme loose, 2in. to 5in. long. Late summer and autumn. *l.* linear, ¼in. broad. *h.* 1½ft. China, &c., 1821. SYN. *O. spicatus* (of Don). The form known as *argenteo-marginatus* has its leaves edged with white; the flowers also are pure white.

O. spicatus (spike-flowered), of Don. A synonym of *O. japonicus intermedius.*

O. spicatus (spike-flowered), of Ker. A synonym of *Liriope graminifolia.*

OPHIOXYLON. Included under **Rauwolfia** (which *see*).

OPHRYS (an old Greek name used by Pliny, from *ophrys*, eyebrows; referring, perhaps, to the fringe of the inner sepals, though Pliny refers it rather to the use of the plant in painting the eyebrows). SYN. *Arachnites.* ORD. *Orchideæ.* A confused genus of very pretty, terrestrial, hardy or nearly hardy, Orchids, allied to *Orchis*, but (except in one species) without any spur, and the lip is usually very convex. Upwards of thirty species have been enumerated; they are natives of Europe, Western Asia, and North Africa. Sepals subequal, free, often concave, spreading; petals two, narrow-oblong, entire. The species generally thrive best in a sandy, chalky loam. *O. apifera*, and the other British species, are suitable for the rock-garden; the rest are best grown in a cold frame. All may be propagated by divisions of the tuberous roots; but most of the species increase very slowly, or scarcely at all, under cultivation. The species best known to gardens are those here described.

O. apifera (bee-bearing).* Bee Orchis. *fl.* with greenish petals and rose-coloured sepals; lip as long as the sepals, with reflexed marginal lobes, the terminal one subulate, the rest hairy above; spike few-flowered. April. *l.* few, glaucous. Stem about 1ft. high. Europe (Britain). (Sy. En. B. 1467.)

O. arachnites (cobwebby). This species differs principally from *O. apifera* in the sub-deltoid, ovate petals, in the lip being longer than the sepals, and in the straight or incurved appendage. Europe (Britain). (Sy. En. B. 1468.)

O. aranifera (spider-bearing). Spider Orchis. *fl.* with green sepals and petals; lip dark brown, as long as the sepals, with roundish, hairy, reflexed, marginal lobes; spike few-flowered. April. Stem about 6in. high. Europe (Britain). (Sy. En. B. 1469.)

O. bombilifera (bee-bearing). Humble-bee Orchis. *fl.*, sepals green; petals recurved; lip deeply trilobed, the central lobe chocolate-brown, sub-globular, the lateral ones conical, and prolonged below; anther red, obtuse, bent backwards. *l.* small, oblong-lanceolate. Mentone, &c. (Fl. Ment. 72.)

O. lutea (yellow).* *fl.* ⅜in. to 1in. in diameter; sepals oblong, obtuse, incurved, green; petals much smaller, yellow or yellow-green; lip nearly quadrate, golden-yellow, with a purple disk and a contracted base, convex, three-lobed towards the tip; scape 4in. to 7in. high, stout, many-flowered. *l.* spreading, linear-oblong, 1¼in. to 2½in. long. South Europe. SYN. *O. vespifera.* (B. M. 5941.)

FIG. 748. FLOWER OF OPHRYS MUSCIFERA.

O. muscifera (fly-bearing). Fly Orchis. *fl.* with green sepals and dark red linear petals; lip twice the length of the sepals, with four expanded lobes, somewhat downy, and having a pale blue spot in the middle; spike slender, about six-flowered. June. Europe (Britain). See Fig. 748. (Sy. En. B. 1471.)

O. Speculum (looking-glass).* *fl.* greenish; lip quadrate-oblong, convex; the disk steel-blue, edged with gold, and the whole

Ophrys—*continued.*

broadly margined with maroon-purple. *l.* linear-oblong. Stem 4in. to 12in. high, bearing several flowers. South Europe, 1818. (B. M. 5844; B. R. 370.)

O. tenthredinifera (sawfly-bearing). *fl.* varying in colour; petals spreading; lip villous, oblong, obovate, the apex bilobed, appendiculate. April and May. Stems leafy. *h.* 9in. South Europe, 1815. (B. M. 1930; B. R. 205, 1093.)

O. vespifera (wasp-bearing). A synonym of *O. lutea.*

OPLISMENUS (from *hoplismenos*, awned; referring to the awns). SYNS. *Hekaterosachne, Orthopogon.* ORD. *Gramineæ.* A small genus (three or four species) of stove or greenhouse Grasses, allied to *Panicum*, broadly dispersed over the tropical and sub-tropical regions of the globe. Spikelets one-flowered, articulated with the pedicel; glumes four; panicles unilateral. Leaves narrowly or broadly lanceolate, flat. These somewhat large-leaved grasses are of easy culture; they grow freely in a mixture of loam, leaf mould, and sand, and make nice plants for table decoration, &c. They are propagated by division; or by seeds, which are freely produced. The two species mentioned below succeed either in the stove or greenhouse.

O. hirtellus (slightly-hairy).* *fl.*, sheath pilose; spikes distant; common axis pubescent; spikelets three to ten, pubescent; lowest awn smooth, bluntish, three to five times as long as its glume; third glume shortly awned, furnished with a palea. June and July. *l.* lanceolate, acuminate, undulate, puberulous, 1½in. to 2½in. long. West Indies, 1795. SYN. *Orthopogon hirtellus.*

O. loliaceus (Tares). *fl.*, sheath glabrous, ciliate or pilose; spikes usually oblong; common axis nearly glabrous; spikelets fascicled; lowest awn three or four times as long as its glume; third glume shortly awned, furnished with a palea. July and August. *l.* oblong-lanceolate or lanceolate, acuminate, 2in. to 4in. long. Trinidad, 1820. SYN. *Orthopogon loliaceus.*

OPLOTHECA (of Nuttall). Included under *Frœlichia.*

OPOPONAX CHIRONIUM. A synonym of **Malabaila Opoponax** (which *see*).

OPORANTHUS. Included under **Sternbergia** (which *see*).

OPPOSITE. Placed on opposite sides of some other body or thing, and on the same plane.

OPUNTIA (the old Latin name used by Pliny, and said to be derived from the city of Opus). Indian Fig; Prickly Pear. ORD. *Cacteæ.* A genus of greenhouse, or hardy succulent trees or shrubs, natives of the tropical and warm regions of America; some of the species have become widely naturalised in the Old World. About 150 species have been described, but many of these are not sufficiently distinct to merit specific rank. Flowers yellow, red, or purple, lateral; calyx tube not produced above the ovary; lobes numerous; petals numerous, connate at base, spreading; stamens many-seriate. Berry pear-shaped, tubercled. Leaves scale-like, deciduous. Stem terete at base, branched; branches articulated, flat, compressed, globose or sub-cylindrical, tubercled; tubercles tomentose, spiny, the young ones leafy.

The cultivation of Opuntias is very easy. All that is necessary for plants in pots is to secure thorough drainage, and give all the light possible. Formerly, broken brick rubbish was supposed to be essential to their well-being, but good loam alone will do quite well. Powdered bricks, mixed with the loam, however, suit the smaller-growing kinds, and insure rapid drainage. During winter, a smaller supply of water is required; indeed, when at rest, the plants should be kept almost dry. The hardy species are extremely interesting, and grow freely in sunny spots in the open air, provided some means be adopted to guard against superabundance of moisture. Some of them, in their native habitats, withstand much more cold than ever is experienced in Britain; but the dry air, or the covering of snow, protects them. An ordinary hand-light, placed over the plants, is shelter enough, provided the position in which

Opuntia—*continued.*

they are placed is dry and efficiently drained. Opuntias may be propagated by means of the branches, or portions of them; these should, after being cut off, be laid on a dry shelf for a time, and then planted or laid on well-drained pots of loam and brick-dust; but very little water should be given until roots are emitted. Seeds, too, are readily raised; the appearance of the seedlings

FIG. 749. SEEDLING OPUNTIA, showing Mode of Germination.

is shown in Fig. 749. The following extracts from the "Transactions of the Horticultural Society" are interesting as showing what may be done in a Surrey garden; they are from a paper "On the Treatment of the Cactus Opuntia, or Prickly Pear; under which it will perfectly mature its fruit in the open air of England," read on 3rd Sept., 1816, communicated by Mr. John Braddick, Thames Ditton: "Having heretofore observed that the plant, in its wild state, delighted in a dry soil amongst rocks near the skirts of the sunny sides of the forests [the writer is speaking of Virginia], I, in consequence, planted it in the compost described below, placed in a sheltered position open to the sun. The first plant that I turned out has lived in the open ground of this country for six or seven years, during which period it has endured one exceeding hard winter, and several trying springs; and in all, except the first two years, it has never failed to ripen its fruit and seeds, so that it may be now considered decidedly naturalised. It is now growing vigorously; and, although the present season has been decidedly unfavourable, yet I doubt not but it will produce a plentiful crop of flowers, and ripen its fruit fit for the table during the course of the next month. . . . The compost used by me for growing the Cactus Opuntia is the following: One half is carbonate of lime, for which lime rubbish from old buildings will answer; the remaining half consists of equal portions of London clay and peat earth, having the acid neutralised by barilla; these are intimately blended and sifted. One square yard of this compost I conceive to be sufficient for one plant, which must be placed in the middle of a small artificial hillock, raised eighteen inches above the surface of the ground, which ground should be rendered perfectly dry, if not naturally so, by under-draining. Neither the leaves, flowers, nor fruit should ever be suffered to touch the ground; but they should, as constantly as they are produced, be kept from the earth, by placing stones, pebbles, flints, or

Opuntia—*continued.*

bricks under them, in imitation of artificial rockwork." All the species mentioned require greenhouse treatment, except where otherwise stated. Probably several others would succeed in the open, in addition to those marked hardy.

O. andicola (Andine). Plant much-branched; joints Cucumber-like, elongated, attenuated at apex, shining brownish-green in colour, at length woody; are olæ somewhat crowded, setose; prickles three or four, sub-rigid, slender, and one or two long ones, white. Andes of Chili.

O. arborescens (arborescent).* *fl.* beautiful purple, 2½in. to 3in. in diameter; stigmas eight. Summer. *fr.* about 1in. long. Stems about 5ft. high (said to attain a height of 20ft. or 30ft. at its southern limits); tubercles green, spiny, compressed-cristate, elevated, ⅜in. long; spines very variable in number and size. Mexico, &c.

O. Auberi (Auber's). Plant erect, large; joints glaucescent, thick, oblong-ovate, with repand margins; areolæ remote; prickles mostly four, white, angular, one or two larger than the rest. Cuba.

O. aurantiaca (orange). *fl.* orange-yellow. Joints linear or linear-lanceolate, divaricate, compressed at apex, terete at base, marked with dark green spots around the areolæ; areolæ large convex, white-tomentose; spines unequal, the three longer ones rigid, brown, divergent, the two or three shorter ones white. *h.* 3ft. Chili, 1824. (B. R. 1606.)

FIG. 750. OPUNTIA BASILARIS.

O. basilaris (base-branching). *fl.* rose-purple, large. Summer. *fr.* sub-globose, deeply umbilicated. Stems low, branching only from the base; joints obovate, often retuse or fan-shaped; areolæ very close, densely covered with short, brown bristles. California, Arizona, &c. See Fig. 750.

FIG. 751. OPUNTIA BOLIVIANA.

Opuntia—*continued.*

O. Bigelovii (Bigelow's).* "Branches forming a dense head; younger joints erect, adpressed, fragile, often shaken off by the wind, and covering the soil around, taking root everywhere, or sticking to the clothes of the passers-by, like burrs" (Engelmann). Joints 2in. to 6in. long, fresh light green, covered with the small, almost hemispherical tubercles, which are arranged mostly in thirteen spirals. *h.* 10ft. to 12ft. Colorado.

O. boliviana (Bolivian). Stem articulated, sub-erect; joints 2in. to 2½in. long, ovate-oblong, smooth, very pale green, becoming yellowish with age; tubercles round, young ones greyish-yellow; prickles 3in. to 4in. long, flexible, white, sub-pellucid. *h.* over 1ft. Bolivia. See Fig. 751.

FIG. 752. OPUNTIA BRACHYARTHRA.

O. brachyarthra (short-jointed). *fl.* small; stigmas five. Plant ascendent; joints ovate or orbiculate, tumid, often sub-globose, tubercled; tubercles crowded; prickles in groups of from three to five. See Fig. 752.

O. braziliensis (Brazilian).* *fl.* bright lemon-yellow, 1in. to 1½in. in diameter; petals imbricated, sub-patent, the outer ones short, thick, and fleshy, the inner ones from ½in. to 1in. long. May and June. *fr.* transparent-yellow, sub-globose, with dense fascicles of chestnut-coloured bristles. Branches horizontal or declining, spiny; ultimate joints obovate or obovate-oblong. *h.* 10ft. to 30ft. Brazil, 1816. (B. M. 3293.)

O. candelabriformis (candelabrum-shaped). Plant sub-erect; joints obovate or elliptic, glaucous-green; areolæ somewhat crowded; prickles four or five, white, and one very long one. Mexico.

O. cochinellifera (Cochineal-bearing). A synonym of *Nopalea coccinellifera.*

O. corrugata (wrinkled). *fl.* reddish-yellow. August. Stem articulated; joints erect, cylindrical, green; areolæ crowded; prickles pale tomentose, the upper ones very minute and setaceous, the lower ones six to eight, white, and elongated. *h.* 2ft. Chili, 1824.

O. crinifera (hair-bearing). Plant sub-erect; joints ovate or elongated, slender, greenish; areolæ somewhat crowded, white, convex; lower prickles three or four, slender, slightly rigid, reddish; upper ones copious, white, long, silky. Brazil, 1846.

O. curassavica (Curassoa). *fl.* yellow. June. Plant sub-erect; joints fragile, cylindrico-ventricose, compressed, dark green, much divaricated; areolæ crowded, white-tomentose, slightly woolly; prickles three to five, unequal, dark, eventually becoming white, acutely pungent. *h.* 6ft. Curassoa, 1690. There are several varieties of this species.

O. cylindrica (cylindrical).* *fl.* scarlet, 1in. in diameter, inconspicuous, several together just below the ends of the branches; petals short, erect. *fr.* pale yellowish-green, 2in. long, 1in. broad. *l.* deciduous, ½in. long, cylindrical, acute. Stems several, cylindrical, the main one 6ft. or more high, all thickly armed with pale or white, fine, but not long, spines. Peru, 1799. (B. M. 3301.)

O. Davisii (Davis').* *fl.* of a remarkable bronzy-greenish colour, 2in. in diameter. Stems tuberculate-terete, ½in. in diameter; spines five or six in a tuft, about ½in. long. New Mexico, 1883. A small, shrubby species. (B. M. 6652.)

O. decipiens (deceptive). Plant erect, branched, green; branches spreading, cylindrical, attenuated at base; tubercles few, somewhat spirally disposed; areolæ small; central prickles yellow, tunicated, spreading-deflexed, the rest (three or four) smaller, somewhat radiating. Mexico.

O. Dillenii (Dillenius'). *fl.* yellow. September. Plant erect; joints obovate-rotundate, undulated, glaucous; areolæ clothed with yellow, eventually white, tomentum; prickles divaricate, yellowish, three to five small ones, and one strong longer one. *h.* 5ft. (B. R. 255, under name of *Cactus Dillenii.*)

O. echinocarpa (spiny-fruited).* *fl.* pale greenish-yellow, about 1½in. across. Summer. *fr.* depressed, deeply umbilicate, very spiny. A low, much-branched, spreading speces, with ovate-clavate joints densely covered with numerous spines, which are loosely coated with a whitish, glistening sheath. Colorado, &c.

O. Engelmanni (Engelmann's).* *fl.* yellow, with a reddish centre. May and June. Plant large, erect, 4ft. to 6ft. high; joints obovate. Chihuahua, 1854. Hardy.

Opuntia—*continued.*

O. Ficus-Indica. Indian Fig. *fl.* yellow. May. *fr.* red within, bristly, ovate, edible. *l.* subulate, bristly in the axils, without spines. Stem erect, spreading; joints oval and obovate, 1ft. long. *h.* 2ft. Mexico, &c., 1731. Hardy. SYN. *O. vulgaris.* See Fig. 753.

O. floccosa (woolly). Stem club-shaped at base, thick, shining green, crested, tubercled; tubercles fleshy, prominent; areolæ axillary, elongated, woolly. *h.* from 4in. to 5in. Bolivia.

O. fragilis (fragile). *fl.* small. *fr.* ovate, scarcely spiny. *l.* minute. Plant sub-decumbent; joints small, ovate, somewhat compressed, tumid or sub-globose, hardly tuberculate, shining green; tubercles somewhat crowded, large, white-tomentose; prickles robust. North America, 1814.

O. frutescens (shrubby). *fl.* greenish, small. *fr.* scarlet, obovate, without tubercles. Plant shrubby, erect, with slightly erect branches; joints terete; spines almost solitary. Mexico, 1838.

O. glaucophylla (milky-green-leaved). Plant erect; joints obovate, somewhat undulated, glaucous; prickles one or two, subulate, less than 1in. long. Mexico.

FIG. 753. BRANCH OF OPUNTIA FICUS-INDICA, showing Fruits.

O. grandis (large). A synonym of *O. stenopetala.*

O. Kleiniæ (Mrs. Klein's). Plant erect, branched, greyish-green; branches erect, cylindrical, tuberculated; fascicles usually spirally disposed; areolæ velvety; prickles, one white, large, spreading-deflexed, the rest reddish-white, innumerable. South Mexico.

O. leptocaulis (slender-stemmed). Plant erect, branched; branches cylindrical, erect, tuberculated; fascicles spirally disposed; areolæ sub-tomentose; prickles about three, setaceous, greenish, patent-deflexed, the rest setose, crowded, reddish. North Mexico, 1845.

O. microdasys (small-thick).* Plant sub-erect, diffuse; joints obovate or lanceolate, green, thick at base; areolæ regularly clustered. South Mexico, 1845.

O. missouriensis (Missouri).* *fl.* light yellow. May to July. *fr.* dry, prickly. *l.* minute; axils armed with a tuft of straw-coloured bristles and five to ten slender, radiating spines, which are 1in. to 2in. long. Plant prostrate; joints broadly obovate and flat, 2in. to 4in. long, tuberculate. North America, 1814. Hardy.

O. monacantha (one-spined). Plant erect; joints large, elliptic or ovate-oblong, much compressed, glabrous, green; areolæ remote, with very short, greyish, bristly tomentum and a single, rigid, brown spine, yellow at apex. *h.* 1ft. Brazil, 1816. (B. R. 1726, under name of *Cactus Opuntia Tuna.*)

O. multiflora (many-flowered).* *fl.* yellow. Summer. Plant erect; branches large, ovate or elliptical, flattened; spines clustered, numerous, unequal. See Fig. 754.

O. nigricans (blackish). *fl.* pink. August. Plant erect; joints large, ovate or lanceolate, green; areolæ remote, fulvous; prickles two or three, unequal, divergent, rigid, dark greenish. *h.* 3ft. South America, 1795. (B. M. 1557, under name of *Cactus Tuna nigricans.*)

Opuntia—*continued.*

O. papyracantha (papery-spined). Plant with sub-globose joints and long, papyraceous spines. Argentine Republic, 1872.

O. Parmentieri (Parmentier's). *l.*, leaflets dark red, slender. Joints cucumber-like, pale green; areolæ spirally disposed, convex, with reddish-brown tomentum; lower spines two or three, white-stramineous. Paraguay.

FIG. 754. FLOWERING BRANCH OF OPUNTIA MULTIFLORA.

O. Pes-corvi (crow-foot). *fl.*, yellow, large; sepals and petals eight to twelve, cuneate; stigmas four. Summer. Stems diffuse, prostrate; joints 1in. to 3in. long, cylindrical, or somewhat flattened, spiny; spines by pairs, unequal, elongated. *h.* 1ft. to 2ft. South United States.

O. phæacantha (gay-spined). *fl.* yellow, numerous, around the summit of the joints; stigmas six. June. Stem erect; joints oblong; spines yellow or brown painted, strong, unequal. *h.* 3ft. Mexico, &c., 1811. (B. M. 2691, under name of *Cactus polyanthos.*)

FIG. 755. OPUNTIA PLATYACANTHA.

O. platyacantha (flat-spined). Plant with a low-branching stem, with spreading, cylindric, slightly tuberculated, shining brown branches; areolæ large, immersed, armed with setæ and spines of different forms and sizes. See Fig. 755.

O. Pœppigii (Pœppig's). *fl.* pale yellow, 2in. in diameter, sessile or shortly-stalked, having an exceedingly short ovary, about ½in. long. *l.* incurved, cylindrical. Branches leafy; spines spreading, solitary, ¼in. to ¾in. long. Chili, 1884. A dwarf bush. (R. G. 1129.)

O. pulverulenta (powdery). Plant erect, thick, cylindrical, pale greyish-blue, powdery, with oblong tubercles; areolæ on the tops of the tubercles large, round, bristly, and with two prickles, one of which is very long and the other shorter. Tropical America.

Opuntia—*continued.*

FIG. 756. OPUNTIA RAFINESQUII.

O. Rafinesquii (Rafinesque's).* *fl.*, often with a red centre, larger, and with more numerous petals (ten to twelve) than in *O. vulgaris*. June. *l.* spreading, some of the axils bearing a few small spines and a single strong one, 9in. to 12in. long. Plant with deep green joints. *h.* 1ft. North America, 1868. Hardy. See Fig. 756.

O. Salmiana (Prince Salm-Dyck's).* *fl.* yellow, red. September. Plant erect, branched, of a greyish-green colour; branches cylindrical, without tubercles; areolæ somewhat crowded, white-tomentose, the mature ones pulvinately globose, the lower ones with three or four minute, reddish prickles. *h.* 2ft. Brazil, 1850. (B. M. 4542; L. & P. F. G. i. 101.)

O. Segethi (Segeth's). This species is similar in habit to *O. Pœppigii*, but has much longer flowers, the ovary being 3½in. long, with a few thick, cylindric, spreading bracts, 1in. long; corolla pale pink, 1½in. in diameter. Chili, 1884. (R. G. 1129.)

O. stenopetala (narrow-petaled). *fl.* yellow, small; sepals and petals subulate, sub-erect. Plant prostrate; joints large; prickles one to three, deflexed. Mexico, &c., 1835. SYN. *O. grandis*.

O. sulphurea (sulphur-coloured). *fl.* yellow. July. Stem articulated; joints erect, sub-globose, of a beautiful green colour; prickles pale-tomentose; upper ones bristly, dark purple, very minute, penicillately collected; lower ones six to twelve, elongated, acicular, white, purple at the apex; central ones very long. *h.* 2ft. Chili, 1827.

O. Tuna (Tuna).* *fl.* reddish-orange. July. *fr.* rich carmine, 2in. to 3in. long. Branches jointed, 4in. to 8in. or more long, oval or oblong, with distant bundles of yellow, unequal, spreading spines. Stem (of an old plant) sometimes 20ft. high. West Indies, &c., 1731. See Fig. 757.

O. tunicata (coated-spined). Plant sub-erect, much-branched; branches green, divergent, attenuated at base, tuberculate-arcolar; areolæ obtuse, oblong, white-tomentose; prickles four to six large ones, and two or three small ones, all white, membranous, sub-pellucid, tunicated. Mexico, 1840.

O. Turpinii (Turpin's). Plant articulate, erect, low, with mammillariform tubercles, greyish-green; joints globose-ovate, crowded, young ones about 2in. in diameter; areolæ round, white-tomentose; prickles biformed, varying from three to ten lines long. Chili, 1844.

O. vulgaris (common).* *fl.* pale sulphur-yellow. June. *fr.* nearly smooth, pulpy, edible. *l.* minute, ovate-subulate and appressed; axils bristly, rarely with a few small spines. Plant low, prostrate or spreading, with flat and broadly obovate joints. *h.* 2ft. Mexico, &c., 1596. (B. M. 2393, under name of *Cactus Opuntia*.)

O. vulgaris (common), of Tenore. A synonym of *O. Ficus-Indica*.

ORACH (*Atriplex hortensis*). A plant sometimes cultivated for the use of its leaves, principally as a substitute for Spinach. It will grow in almost any soil, but produces the largest leaves in that which is rich. Sow seed in drills, 2ft. apart, in March, and again, successionally, if much in demand, as the plants soon run to seed. If seed is required, it should be collected before becoming quite ripe; otherwise, the wind will carry it away. The flowers should be pinched off if seeds are not to be kept. There are about three varieties, distinguished by their colours, *i.e.*, white or pale green, red, and purple. The plant commonly called Red Mountain Spinach (*A. hortensis rubra*) has fine, ornamental foliage, grows to a height of 3ft. or 4ft., and is very useful in sub-tropical gardening. It is a hardy annual; consequently, a new stock must be raised each year.

Orach—*continued.*

ORANGE. *Citrus Aurantium*, and some of the other members of the Orange family, have been cultivated for so long a period, and over such an extended geographical area, that it is scarcely possible to refer the numerous forms, which have originated under culture, to their respective and specific types. There can, however, be no doubt that the two or three parent types,

FIG. 757. OPUNTIA TUNA.

Orange—*continued.*

from which the host of forms have sprung, are of Asiatic origin. Some idea of the number of these cultivated varieties, and their range of differences in the size, form, colour, and taste of the fruits, may be obtained when it is stated that, in the "Histoire Naturelle des Orangers," a folio work, by Risso and Poiteau (1818), there are no less than 109 plates. The literature of the subject is very considerable; but the most important work, besides the one just mentioned, is Gallesio's "Traité du Citrus" (8vo), published at Paris, in 1811.

Under favourable conditions, the Orange is a very free bearer. Wallace mentions a tree in St. Michael's that bore 20,000 fruits in one crop. The longevity of the plant, too, is not less remarkable. At Versailles, one tree is still growing which was sown in 1421, and the famous tree, now upwards of 30ft. in height, in the Convent of St. Sabina, at Rome, is said to be more than 600 years old. "In Cordova, the noted seat of Moorish grandeur and luxury, in Spain, there are Orange-trees still remaining which are considered to be 600 or 700 years old" ("Treasury of Botany").

Some commentators suppose that the "Apples of Gold" were Oranges; but there does not seem to be any definite evidence that the Orange was cultivated in Palestine in the time of Solomon. More than 700 years later, Theophrastus, however, describes the Citron as occurring in Northern Persia (Media), and as being cultivated by the Jewish nation, in Syria, while under Roman dominion.

In 1884, no less than 4,958,838 bushels of Oranges and Lemons were imported into this country. Oils of Neroli and Bergamot, highly esteemed as perfumes, are obtained—the first, by distillation, from the flowers of the common Orange; and the second, either by distillation or expression, from the rind of the Bergamot variety.

Cultivation. At one time or another during the long period in which varieties of the Orange have been cultivated in this country, a few plants at least have been amongst the occupants of almost every garden of any extent, more especially in those established at an early date. An orangery, as it is termed, is usually a massive building, found in gardens adjoining old mansions, and not unfrequently constructed with a ceiling and a slate roof, on an architectural design externally similar in detail to the mansion. The custom was to grow Orange-trees in large tubs or pots, keep them throughout the winter in an orangery, and place them in the open air during summer. Since the introduction of glass into all houses devoted to horticultural purposes, and such numerous representatives in the way of plants have been brought from foreign lands, conservatories have taken the place of orangeries in most of the gardens of modern times. Orange-trees, too, are not grown now to nearly the extent they were formerly, even for ornamental purposes. In gardens where an orangery still stands, its special occupants seem to have vanished. This may partly be accounted for by the plants being exposed to a continued low temperature, by their being placed in a position throughout the winter, in a house with insufficient light, and by the application of too much water at this season. Orange-trees have at all times been grown in this country more as decorative plants than for the use of their beautiful fruits, when these are well ripened, for dessert. The highly fragrant flowers and glossy evergreen foliage are of themselves sufficient to render the tree deservedly attractive as a decorative subject; and the frequency with which orange blossoms are in demand for bridal festivals, &c., is well known as being another explanation of the plant's popularity. There is scarcely any part of the season when neither flowers nor fruits are present, in at least some stage of development, on trees of sufficient age and size for producing either or both of them.

Orange—*continued.*

Orange-trees grown in tubs should be provided with efficient drainage, and be placed in soil calculated to last a long time, such as a compost of good loam, to which may be added some dry cow manure or crushed bones, and some charred ballast, charcoal, or sand, to keep the whole open. If the roots become unhealthy, or are not properly attended to, indications of the foliage turning yellow and becoming sickly are soon apparent. In the treatment and cultivation of the Orange, it must be remembered that the tree is a fruit-bearing subject, and not, like many other evergreen plants, of use only for its flowers or ornamental foliage. As such, it must never be allowed to become very dry at the root, it must have a season of growth, and another of rest, and always have plenty of light. The roots, too, should not be interfered with more than is really necessary; but comparative restriction is recommended, provided the soil is good, and attention is given to applying an annual top-dressing in spring. Deer or sheep dung, with a little loam intermixed, forms an excellent top-dressing. When the trees are grown for ornamental purposes alone, they are not usually subjected to anything higher than a greenhouse temperature. Under this treatment, they commence growing about March, and often do not flower until towards Midsummer. The fruits which set afterwards are too late for ripening before autumn, and, consequently, they hang green throughout the winter, and do not ripen off until the following summer. Thus, under cool treatment, Oranges cannot be ripened in one season, and are then much inferior to what they would be if subjected to a higher temperature, more in accordance with the tree's requirements. It is surprising, however, to what an extent interest is evoked in the minds of visitors to garden establishments on seeing living specimens of trees whose fruits only have, hitherto, been so well known to them from foreign introductions. Orange-trees bear a considerable amount of ill-usage, and, in consequence of this, they are often subjected to so much neglect that specimens seen in gardens, showing signs of bad health by a stunted growth and small yellow leaves, instead of broad, glossy, green ones, are, perhaps, oftener the rule than the exception. The trees should have plenty of water throughout the summer, and be frequently syringed from February onwards to autumn, early in the morning, and again in the afternoon; this tends to keep the leaves clean and also to destroy insects. The plants may either be placed in a sheltered, warm position, outside, during June and the two following months, or kept in a greenhouse, with plenty of air and light. In autumn and winter, water should be partially withheld; but not to an extent sufficient to render the soil quite dry at any time. Any plants that fall into ill-health (indicated by the appearance of the leaves, as already alluded to), through neglect, or as a consequence of improper treatment, should be cut back somewhat in spring, placed in a moist, growing temperature, with some bottom heat, and be kept well syringed. The roots, too, should be examined, and if, as will most likely be the case, many of them are found dead, they should be shaken out, the dead portion cut away, and the others placed in an entirely new compost, with clean drainage, and in a smaller-sized pot or tub. Orange-trees in very large tubs have been efficiently brought from imperfect health into a thriving condition, by the latter being surrounded with a thickness of about 3ft. of fermenting material when the season of growth begins. This is renewed occasionally, until the tree is sufficiently restored to no longer need such help; and, as it is then later in summer, the mean natural temperature is considerably higher than when the new growth needed extra encouragement to induce it to start.

The natural habit assumed by Orange-trees prevents

Orange—*continued.*

the necessity of much pruning or training, merely the shortening of branches that are inclined to take a lead at the first, or in any year, at spring time, being usually all that is necessary to keep the plants compact. Those grown in large tubs are most frequently trained as standards, and the more cutting or pinching of the points is practised, the thicker do the heads become, and, withal, the more formal. If a free growth is allowed, and not much training attempted, the natural habit has, in consequence, a much better chance of development.

So far reference has only been made to Oranges cultivated in tubs or pots for ornamental purposes, or for

FIG. 758. FLOWERING BRANCHLET OF COMMON ORANGE.

the use of their sprays of fragrant blossoms (see Fig. 758) for personal or other decorations. The Orange is, however, worthy of much more attention than it at present receives, by way of cultivation under glass, with a view to the production of home-grown fruits. The excellence and superiority of any fruit that is allowed to become properly ripened before being gathered from the tree, over that which has to be procured and packed, with a view to the ripening process being completed afterwards, is well known in respect of English fruit productions generally; and Oranges are not exceptions to this rule. Anyone who has tasted home-grown Oranges, from trees that have received proper treatment in heated houses, will be well aware of the superior flavour they possess over nearly all those introduced from abroad. Good varieties are of importance, but these are procurable, at least in a sufficient number for all that is required. Although, in Britain, Oranges for fruit production cannot be grown in sufficient quantity to compete with countries where the trees grow freely outside, yet it is strange, considering the excellent quality of the fruit when properly cultivated, to what an extent the trees are neglected in this respect in the great majority of English gardens, even in those where almost every other important kind of fruit is represented. Many, perhaps the majority, of the imported Oranges are gathered when only partially ripe, or even when quite green; and they have, consequently, to ripen and change colour afterwards. This takes place, in great part, after they are packed for exportation, and during their voyage to various parts of the world.

Orange—*continued.*

Oranges cannot be grown to perfection in dark, slate-roofed houses, such as those built in former days specially for their reception, and to which reference has already been made. They are best suited by being grown in pots, or planted inside a span-roofed, heated, glass structure of considerable size, with sashes round the sides for the admission of plenty of light. According to the size of house and trees already at command, or of those it is intended to establish, the interior must be arranged, and beds provided, either for plunging pots in or for planting out the trees. A path may be made through the centre, with beds on either side; or the reverse plan may be adopted, and greater height obtained in consequence. Oranges are greatly benefited by bottom heat, although it is not an absolute necessity for their successful cultivation as fruit-trees. If the trees are grown in pots, these can be plunged in tan, slowly decaying leaves, or similar material, which may be used alone, or in conjunction with hot-water pipes; but, if planted out, heat will be best applied by constructing a chamber beneath the beds, through which pipes might pass. The latter should be thoroughly under control, by means of valves for regulating or entirely stopping heat. There is always a danger of the soil surrounding such chambers becoming unduly dry, and injury thereby caused to to the trees. This must specially be guarded against by strict examinations occasionally, and the application of additional supplies of water should be made over and above that required in other parts of the bed. Efficient drainage is of the utmost importance; from 6in. to 9in. of broken bricks will not be too much for beds, which should also be provided with a drain to

FIG. 759. FRUITING BRANCH OF COMMON ORANGE.

carry away the water; pots or tubs must have a quantity of crocks placed in them proportionate to their size. Loam which has been stacked a sufficient time to kill the grass is recommended for use in a large proportion; a little well-rotted manure may be added, but fruit-trees generally are better provided for by a manure, such as crushed bones, which is calculated to decay slowly, and, consequently, supply nutriment for a long time. Some sharp sand, burnt ballast, or mortar rubbish must be freely incorporated, to keep the whole bulk in an open, satisfactory condition. For the proper cultivation of Oranges in beds, a compost of this description should be used to the depth of from about 18in. to 24in.; and a similar mixture will be equally well suited

Orange—*continued.*

for trees in pots. The drainage, in either case, should have thin, turfy soil laid over the top, to keep it clean. Trees permanently planted out should have considerable space allowed between them. This space may be filled with movable pot-trees until the others grow and require it themselves. The portability of trees in pots is one point specially in their favour, and, if feeding is practised with them during the time the fruits are swelling, and watering is always properly attended to, excellent produce may be obtained from Oranges grown in such houses as those devoted to Fig-tree or Vine culture. Proper and good fruiting varieties only are suitable for the purpose; seedling plants are useless.

Respecting temperatures for Oranges grown for the use of their fruit as dessert, a little bottom heat at command is of importance all the year through. The trees should be encouraged to begin flowering in February by this aid, and a house or air temperature, in winter, of from 45deg. to 50deg. As the days lengthen, the minimum temperature may be increased

FIG. 760. FRUITING BRANCH OF MANDARIN ORANGE.

10deg., and it may be still further raised during summer. In spring, a bottom heat of 80deg. will not be too high for plunging Orange-trees in, if they are out of health, to induce them to start afresh; 70deg. to 75deg. is recommended for others in health. A very light shading in summer is advisable, should the plants be fully exposed to hot sunshine; otherwise, the leaves are liable to be burnt. Careful attention to airing, early in the day, during hot weather, aids materially in preventing scorching. Supposing the trees to flower in February and March, set properly, and receive proper treatment afterwards, the fruits (see Figs. 759 and 760) may be grown to maturity in from nine to eleven months—a long period in comparison with most other fruit-trees. Oranges require plenty of water in their growing season, and it should not be applied at a lower temperature than the soil in which the roots are situated. The free use of tepid water with the syringe or garden engine throughout the same season, except for a short time at the flowering stage, is an essential to success. It should be applied so as not to injure young leaves, but yet with sufficient force to keep the old ones clean, and prevent insects establishing themselves.

Of insects, the most troublesome on Orange-trees are White and Brown Scale, Mealy Bug, and Red Spider.

Orange—*continued.*

The first-named, in bad cases, can scarcely be eradicated without cutting the trees hard back, cleaning their stems, and starting afresh. Sponging, assiduously carried out, with an insecticide, so as to prevent any great quantity of insects from becoming established, should be practised for Brown Scale and Mealy Bug, or the trees may be occasionally syringed with petroleum and water (a very little of the former being used), and afterwards thoroughly syringed with clean water. Red Spider will have but little chance if syringing is practised throughout the summer with the garden engine, in the way above recommended.

Varieties of Dessert Oranges. Information has already been given that it is useless attempting the cultivation of Oranges for dessert except with good and suitable varieties. In "Dessert Orange Culture," one of a series of published papers by the late Mr. Thomas Rivers, of Sawbridgeworth, reprinted from the Report of the International Horticultural Exhibition and Botanical Congress, held in London in 1866, that excellent authority, and, probably, most extensive English cultivator of the Orange as a dessert fruit, makes the following trustworthy remarks respecting the varieties which, from experience, he had proved to be the best. There have been scarcely any other additions of importance made up till the present time:

"One of the most charming and prolific of dessert Oranges is the Tangierine; the tree has small leaves, and seldom attains a height of more than 7ft., even in North Africa. Its most valuable quality is its early ripening, so that, in October, just as the late peaches and other soft fruits are over, this luscious little fruit is ready for the dessert; and, when freshly gathered, no fruit can be more gratifying or delightful, as its aroma is so delicious, and its juice so abundant, in this respect offering a pleasing contrast to those imported from Lisbon, in November and December, the flesh of which is generally shrunk from the rind, instead of being ready to burst, as is the case with those plucked from the tree. They should, in common with all home-grown Oranges, be placed on the table with some leaves adhering to their stalks, thus showing that they have not made a voyage.

"Among full-sized Oranges, the Maltese Blood takes the first rank; when quite fresh from the tree, it differs much from those imported, although the voyage as now made by steamers is of short duration. . . . The great advantage in planting this sort is its tendency to bear fine fruit while the trees are young; they are, indeed, so prolific that trees of only 2ft. in height have here borne nice crops of fruit.

"Some varieties, quite equal to the foregoing in quality, but without the red flesh, so peculiar to these 'Blood Oranges,' have been imported from the Azores, the paradise of Orange trees. One of the most desirable sorts is called simply the St. Michael's Orange. This kind has a thin rind, is very juicy, and bears abundantly, even while the trees are young. In the Orange House these will ripen towards the end of December, and throughout January and February, in common with the Maltese Blood Oranges. . . .

"In addition to the three leading varieties I have mentioned, there are several kinds which will, doubtless, prove interesting and valuable. It is not to be expected that so much variation in flavour, as in the Pear, for instance, can be met with in Oranges. I believe, however, that, when our Orange palates are educated, we shall find many delicate distinctions in the flavour of Oranges. As far as I have gone, I have found the Mandarin Orange larger and more flat in shape than the Tangierine, and not so good as that sort. The Embiguo, the Egg, the Silver Orange, the Botelha, the White Orange, and some others, all varieties from the

Orange—*continued.*

Azores, are of various degrees of excellence, and are all worthy of a place in an English Orange Garden.

"The following descriptive list of the dessert Oranges may be useful to the amateur: Botelha and Dulcissima: Both thin rinded and very rich. Egg: Very large; rind thick; remarkably juicy, but not rich; a great bearer. Embiguo, or Navel Orange: Very large, with a curious, depressed calyx; remarkably rich and juicy. Exquisite: A thin-rinded, rich and juicy fruit. Maltese Blood: Large, oval, with a dark red pulp; exceedingly rich, good, and distinct; fruits from the same tree vary in colour from deep red to the usual pale yellow colour, with faint streaks of red. St. Michael's: Several varieties under this name vary in size and thickness of rind; they are all good. Silver Orange: Colour of rind pale yellow; flesh pale; rind very thin; flavour piquant and delicious. Sustain: Large, and remarkable for its rich, sweet juice. St. Michael's Tangierine: A very distinct variety, differing from the common sort in being deeper in colour, smaller, and more rich in flavour; a charming little Orange. Tangierine (often incorrectly called the Mandarin): Now a well-known sort, varying in shape from fruit much compressed, with rind rough and thick, to oval, with a smooth rind. Variegated Orange: This has a broad margin of white round its leaves, and forms a very ornamental tree; its fruits are oval, of medium size, with a pale yellow rind, striped with green; very juicy, and remarkably brisk and piquant in flavour. White Orange: Large; rind pale yellow, flesh very pale; flavour rich and good."

ORANGE GOURD. *See* **Cucurbita Pepo aurantia.**

ORANGE, OSAGE. *See* **Maclura aurantiaca.**

ORANGE ROOT. *See* **Hydrastis canadense.**

ORANIA (so called in honour of the Prince of Orange—*Oranien*). SYN. *Macrocladus.* ORD. *Palmeæ.* A small genus (three or four species) of tall stove palms, with robust, unarmed, closely-ringed stems, crowned with a dense head of large leaves; they are natives of the Malayan Archipelago and Papua. Flowers minute, unisexual, the spikes inclosed in double spathes, the inner of which is woody. Fruit globose, rather large. Leaf-segments linear, oblique at apex, white, scaly, and irregularly toothed or jagged at their tips. Oranias thrive in a sandy loam, and require an abundance of water when growing; good drainage is essential. They are raised from imported seeds, sown in bottom heat.

O. macrocladus (large-branched). *fl.*, spike pendulous. *fr.* a one-seeded drupe. *l.* pinnate. *h.* 40ft. Malacca, 1847. A stately tree.

O. regalis (Royal). *fr.* red, smooth, the form and size of a small Olive. *l.* 6ft. to 7ft. long; leaflets panduriform-sinuated, white beneath; primary nerves solitary. Trunk low, terete, annulate. Java, 1847.

ORBEA. Included under **Stapelia** (which *see*).

ORBICULAR, ORBICULATE. Circular or spherical.

ORCHARD. There are few gardens connected with private mansions that are of sufficient size for accommodating enough fruit-trees—such as Apples, Pears, Plums, &c.—to maintain a supply of fruits equal to the demands usually made. Orchards have, therefore, to be formed and established; sometimes for the special purpose of meeting such deficiencies, at others for cultivating to supply the market in addition; and again, in some parts, for the main object of procuring Apples to make, or convert into, cider. Those only required for cultivating fruits to supplement the garden crops are naturally best to be situated near the garden, and placed under the gardener's charge. They might contain, if the soil were tilled, small fruits of all descriptions that succeed, in

Orchard—*continued.*

addition to those above-named, and also many trees in size, shape, and variety that would be inadmissible in an Orchard where cattle were allowed. Various circumstances, such as the want of a proper site, or a suitable soil, may, however, render this arrangement—much akin to market gardening, although the produce need not be grown for sale—undesirable, and the best alternative is usually that of utilising a portion of farm land, varying in size according to requirements or the space available. The best of the produce in Orchards connected with private gardens has annually to be stored in the garden fruit-room, and the possibility of gathering and storing it at once in fine weather, without the fruits getting bruised, also the general overlooking of the crop throughout the season, are points greatly in favour of having the Orchard in near proximity. The farm Orchard is best to be laid down in grass, as the cost in the first place, and also subsequent management, will be much less than if the land were tilled. Grass should not, however, be grown for haymaking if it can be avoided, as this affects fruit-trees considerably, and most unfavourably; it should be kept short, preferably by being eaten off by cattle, such as sheep, or young stock that are being fattened. Horses should on no account be allowed if any branches are within their reach. As a general rule, fruit-trees in Orchards have, of necessity, to withstand, or at least be subjected to, more exposure than others situated inside a garden, unless the position of the latter is a most unfavourable one in respect of shelter. Only sorts of proved hardiness in the locality must, therefore, be selected for planting, and such as are calculated to withstand a more or less open situation, and produce crops with tolerable certainty when once established. It is well known that various localities materially affect different sorts of fruit, particularly Pears; in fact, there are but few good varieties of these latter that succeed at all as standards, except in most favoured parts. In the Midland and Northern counties, the number would be extremely limited if it were restricted to those only which are really suitable. The chief Orchard fruit-tree is, of course, that of the Apple, and as varieties of hardy constitution, which produce large, handsome fruits, suitable both for kitchen use or dessert, are now so numerous, none of an inferior character need be included. Still, it is almost certain that all will not succeed alike under similar treatment, and selection will also have to be made in accordance with the purpose for which crops are required, whether they are supplementary to those of the garden, and intended for private use, or grown more especially with a view to supplying the market. Orchards on a large scale are mainly planted with a view to disposing of the greater portion of fruit in the local, or in that of one of the great central, markets, and it will, in such cases, be advisable to know, at the outset, the sorts of fruits that are most in demand, as well as those which succeed best. Where the land is laid down in grass, and cattle admitted, the form of tree is limited to standards, unless provision is made for protecting the lower parts of any of another description. If the soil is tilled, and a sort of market garden system introduced, standards may, if desired, still occupy similar positions—though they would be better at greater distances apart—and the intervening spaces planted with trees of another shape, and such bush fruits as Gooseberries, Currants, Raspberries, &c. A considerable amount more labour is involved, as before stated, in attending to a tilled Orchard, than is requisite for one laid in grass; and this, with the character of the soil, and the value and possible demand for fruit of various sorts when grown, must be considered when an Orchard of either description is in course of formation. Besides the fruits already named, Cherries and Plums are largely

Orchard—*continued.*

represented in Orchards, in at least several of the English counties. Speaking generally, Cherries are not of much use to plant on a small scale, or even at all in most parts, as standard trees, in the open. Temporary protection cannot be afforded them, when thus situated, for preventing injury to the flowers by spring frosts, and great havoc is also caused by birds amongst the buds, as well as amongst the ripe fruits. Where the trees are known to succeed naturally in Orchards respecting the first-named condition, they may be planted in sufficient quantity to make it worth while having them looked after when the fruits are ripening, and both seasons would be greatly shortened by planting only one variety. Plums (under which Damsons may also be included) are limited in varieties suitable for culture in Orchards, especially such as are laid down in grass, many of the branches being situated so near the ground. Their fruits are, however, much in demand, and, in seasons when good crops can be secured, they usually prove more remunerative than most other supplies of home-grown Orchard produce. Damson-trees frequently attain a good size, and bear prodigious crops in favourable seasons; they should be planted rather close together, as the heads do not usually spread much; and, the wood being rather brittle, is less likely to get broken by heavy gales than if the trees were inserted as isolated specimens. Nuts may also be included amongst Orchard fruits, as they will succeed in nearly all situations and localities if their blossoms of both sexes escape destruction by spring frosts. If, however, there are Squirrels, or other depredators, about, it is of little use attempting to grow Nuts; at any rate, not as a profitable crop. A specimen or two of Quince-trees, and also of Medlars, should be provided with a place, as, although their fruits are not much in demand, a few are generally acceptable. The trees are also in keeping with the other occupants of an Orchard, and are, at least (apart from the use of their fruits), distinct and ornamental subjects, on account of their flowers and, in the case of the Medlar, beautifully-coloured foliage in autumn.

Soil and Situation. In the formation of an Orchard, the first points for consideration are those of soil and situation, the first-named being perhaps the most important of the two, although, in some respects, the other is not of secondary consequence. Drainage is of primary importance, and must be insured, either by a subsoil of a gravelly nature, by the natural disposition of the land, or by drains inserted specially for the purpose. No fruit-trees will succeed properly if stagnant water is allowed in or about the soil surrounding their roots. Respecting different soils, there are few in which the most important of Orchard fruits, Apples, will not thrive to a greater or less extent, as evidenced by such a quantity being grown, without special attention, in all parts of the country. The best and most lasting results, however, are obtained in well-drained land where the soil is of a good depth, and somewhat strong. Light or sandy soils tend to induce trees to bear good crops, but only for a short period, compared with those of a more holding nature. In some localities, there is little to choose from; but in others, great variation exists, even in a very limited area. Where subsoils are gravelly, and, consequently, naturally drained, it might, and most likely would, be very unwise to insert pipes, as by them too much water would be conducted away, and the trees, unless the rainfall were unusually heavy, would be unable to withdraw sufficient moisture to meet their requirements. The situation best suited for an Orchard is a gentle slope to the south or south-west. It is not advisable to select an eastern exposure, as, although the early morning sun is most desirable for many reasons, it frequently adds to the destruction, by frost, of fruit blossoms in spring, by causing the

Orchard—*continued.*

latter, when frozen, to thaw too rapidly. Shelter is of material importance, and, where it exists naturally, due advantage should, if possible, be taken of the site, provided other conditions are favourable. Much may frequently be done towards providing shelter to an Orchard, by planting a belt of quick-growing forest-trees — Larch or Poplars, for instance—at a safe distance away on the north and eastern sides, whence destructive winds proceed. These trees must not, however, be planted close enough for their roots to impoverish the cultivated ground. Orchard fruit-trees shelter each other to a certain degree when established, if they are not planted too far apart. To get them up to this stage, some protection will invariably be necessary; and, should the site be unfavourably situated in this respect, it must be provided, if only to the extent of planting a high hedge, to serve as a break against rough, cold winds. Exposure to full sun and light on the south side is recommended, as it is important that the wood of fruit-trees in a bearing state should be thoroughly ripened in summer for the next year, as well as the fruit of the current year. Spring frosts are far less injurious when the blossoms are strong and the wood firm, than when both are in the reverse condition.

Planting. This operation will depend somewhat on whether the land between the standard trees is to be laid down in grass, or dug and occupied with other crops and dwarf fruit-trees. If a piece of pasture land is taken for converting into an Orchard, without destroying the turf, it is most important that good-sized holes be dug out, so that the roots may be spread carefully, to their full length, in planting, and the soil moved for a considerable space round further than the distance to which they extend. Young trees would, however, be likely to succeed better were the land for an Orchard well broken up by deep ploughing, or, maybe, on a large scale, by steam cultivation, previous to being planted. The intervening space, to within a short distance of the trees, might then be annually cropped with such things as Potatoes or Turnips, but not with grain of any sort. As the trees get old enough for their heads to overshadow crops beneath, their roots will also have similarly extended, and the whole surface may then be sown with grass seeds, and changed into pasture. In tilled Orchards, where it is not intended to admit cattle at any time, the land between standard trees may be planted with others grown in bush or pyramid form, or with those usually termed small fruits. Standard fruit-trees for Orchards should have stems about 5ft. high, and be planted from 16ft. to 20ft. apart. A greater distance than this is sometimes recommended; but, as a rule, it is unnecessary, even for the admission of light and air, and the trees do not shelter each other so much as when they are somewhat closer together. November, if weather permits, is, perhaps, the best season for planting Orchards; but, if the operation cannot be conducted at this season, any favourable time up to the end of February may be selected, providing the weather is not frosty. No fruit-tree should be planted too deeply in the soil, with the idea of preventing its removal by the wind; a stake to each—in the case of standards, at least—must be provided for this purpose. The same depth as that to which the trees have previously been planted is usually a fairly good guide—say, from 3in. to 4in. of soil above the roots. Any newly-planted fruit-tree, over which the wind may have power, should, apart from being well trodden in, be securely staked, either temporarily or permanently, as the case may be; a little hay or moss, or a piece of old gutta-percha piping, should be placed where each tie is made, to prevent the bark being injured in tying, or afterwards by chafing. It is impossible for young roots to obtain a hold, if the trees are allowed to sway about, and break them off so soon as

Orchard—*continued.*

formed. A mulching of half-rotten manure, or anything of a non-conducting description, should always be applied to the surface so soon as the planting is finished; and watering occasionally, or, perhaps, frequently, according to the season, will doubtless be necessary throughout the following summer.

If the soil is of itself workable, as it should be, and fairly good, it would be best used alone around the roots of newly-planted trees. Manure is frequently very injurious in such a position, when it might be made of great benefit by being placed above, where its goodness could descend, and afford nourishment after some new root-growth were made. Feeding with manure may, at times, be carried to an excess; as, for instance, when strong, sappy growths are produced, instead of firm, short-jointed ones. A free growth should by all means be encouraged, particularly in young trees; but it is desirable that the wood should become well ripened in any case, and it is a necessity in trees large enough for bearing.

Pruning is not very much required in Orchards, except a little cutting back the first year or two, to insure evenly-balanced heads, and just enough thinning afterwards to prevent overcrowding. Much finer fruits are obtained from such fruit-trees as those planted in Orchards, when they are allowed to grow freely and naturally, always provided there is plenty of space for the admission of sun, air, and light.

Selections of Fruits for Orchards. Fruit-trees, as standards, to bear the exposure of an Orchard, must, of necessity, be free-growing, and of a hardy constitution, the degree of hardiness necessary being regulated somewhat by the locality. A list of such varieties of the principal fruits as are, from their strong-growing and generally productive nature, calculated to succeed, when treated in the way referred to, can only, therefore, be given.

Apples. Alfriston, Beauty of Kent, Blenheim Orange, Cellini, Devonshire Quarrenden, Duchess of Oldenburg, Dumelow's Seedling, Fearn's Pippin, Golden Winter Pearmain, Hawthornden, Herefordshire Pearmain, Kentish Fillbasket, Keswick Codlin, Lane's Prince Albert, Lord Suffield, Manks Codlin, Mère de Ménage, Northern Greening, Small's Admirable, Stirling Castle, Tower of Glammis, Warner's King, Worcester Pearmain, Wormsley Pippin, Yorkshire Greening.

Cherries. Adams' Crown, Bigarreau, Bigarreau Napoléon, Black Eagle, Büttner's Black Heart, Downton, Elton, Kentish, Knight's Early Black, Late Duke, May Duke, Morello.

Damsons. Cluster or Crittenden, Common, Farleigh Prolific, Prune, Rivers's Early.

Pears. Autumn Bergamot, Beurré Capiaumont, Doyenné Boussoch, Fertility, Hessle, Jargonelle, Jersey Gratioli, Louise Bonne of Jersey, Swan's Egg, Williams' Bon Chrêtien, Windsor, Winter Nelis.

Plums. Diamond, Early Orleans, Goliath, Pond's Seedling, Prince of Wales, Victoria.

ORCHARD HOUSE. A most useful structure, devoted to the cultivation more especially of fruit-trees that do not succeed favourably in the open air. There are but few localities over the area covered by the British Isles in which any of our comparatively tender fruits can be obtained in perfection annually outside, and, in the more Northern parts, many of them fail altogether to produce crops, except under glass protection. Pot culture of fruit-trees in Orchard Houses has been practised some thirty or more years. It was at first confined simply to providing glass structures on a roughly-built scale; but many improvements have since been suggested and carried out, as a result of the experience gained, and because of the extent to which the system has been adopted, not only in this country, but in some parts of the Continent, and more extensively in the United States. An Orchard House may be either heated or unheated. The mere protection it affords, in spring and summer,

Orchard House—*continued.*

because of the bulk of warmed air contained in the interior, even when unheated by hot water, is most marked, even in favoured localities, when the fruits are gathered and compared with others of the same sorts grown outside. A very great advantage is, however, secured by having artificial heat at command in spring. At this season, mild weather may induce the blossoms to open earlier than is desirable, and a glass roof would be insufficient of itself to prevent injury, should there be a severe frost. Again, the prevalence of dull, cold weather at the same season is generally more injurious to expanded fruit blossoms than even a little frost with bright days; and this is the time for using a little artificial heat. It need not, and, in fact, must not, be used very much; but the exclusion of frost, and the preservation of a somewhat dry and airy atmosphere, are most important points to be secured onwards from the time the flower-buds expand. When the fruits are set, a little warmth will also materially help them to commence swelling: the fact that they cannot stand still, but must either swell in a short time or drop off, is but insufficiently recognised in gardens generally. Great attention is devoted to fruit-trees when in flower; they are protected by glass, and by coverings of various descriptions—very important precautions, certainly, yet, of themselves, only part of the necessary provision that should be made for assisting the fruits beyond, as well as at the flowering stage, when the weather is unfavourable towards them. A little heat at command also renders an Orchard House of much greater value in winter, when the fruit-trees are dormant. If the latter are limited mostly to such as are grown in pots, they may be arranged nearly close together, or even plunged amongst dry litter or bracken in a sheltered position outside, the house meanwhile being used for plants, such as Chrysanthemums, or others of a hard-wooded description, that flower naturally or have to be forced in spring. Orchard Houses are not usually meant to be used for forcing purposes, although fruit from trees in pots has, under proper treatment, been obtained from such structures equal in quality to that produced in special forcing-houses. An attempt at forcing a number of different fruit-trees in one temperature, and under similar conditions, would, moreover, end in failure—at least, in part. Take the same collection, and gradually bring the different trees forming it into flower, afford them protection at that time, and due attention in respect of cultural requirements throughout the summer, and, in all likelihood, the purpose will be effected for which an Orchard House proper should be intended. Plenty of heat is provided by the sun during summer; it should be utilised to the fullest extent just after the fruits are set, by closing the ventilators somewhat earlier on fine afternoons at that season than is requisite at other times. Fire heat should only be used when it becomes really necessary, and then a little ventilation at the same time is most desirable. To have it at command is, however, a valuable acquisition, which is of material importance for insuring crops, when, otherwise, they would be most likely to fail. Orchard Houses, in their simplest forms, are unheated; but the insertion of hot-water pipes, if only enough to exclude frost, is confidently recommended, for the several reasons already set forth. The main object is that of providing accommodation for the culture of good varieties of somewhat tender fruits, in order that finer produce and superior quality may be secured than that which it is possible to obtain from trees on outside walls, or from such as are in the open ground. The reference to selection being confined to good varieties, is suggestive of what should be specially considered in giving space to trees in an Orchard House. If the fruits of any are but second-

Orchard House—*continued.*

rate when so favoured, the trees should be discarded in favour of others that are more certain to fulfil expectations, and repay the extra attention afforded. The Orchard House and its uses having been so far explained, a reference may now be made to its size and shape, and to the general cultivation and treatment of the various fruit-trees worthy of being included amongst its occupants.

Size and Shape. These are points affecting each other somewhat considerably, so much depending on requirements, and the extent to which it is desirable or possible to adopt the system of fruit culture under notice. The form of structure best adapted is the span roof, as it affords a full amount of light to trees on all sides, and due provision can be made for the admission and free circulation of air, both at top and bottom—in the first place, by means of lifting a portion of roof at the apex, and, in the second, by the opening of upright sashes,

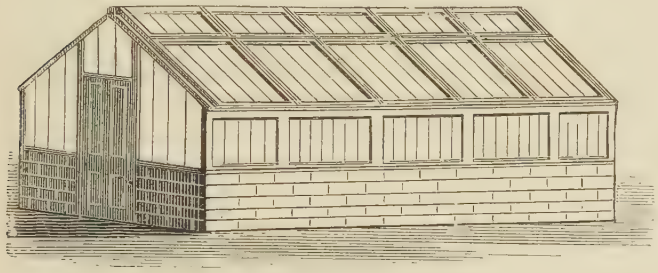


FIG. 761. SPAN-ROOFED ORCHARD HOUSE.

situated above the side walls (see Fig. 761) or weather-boarding—the latter being sometimes substituted in lieu of walls. In many Orchard Houses, only a little top ventilation is given in proportion to the quantity of air required, but there must be some to cause a free circulation about the trees. Airing is mainly conducted by means of side sashes, or by some method of ventilation situated near the ground line. Proportionate sizes for a rather large span-roofed Orchard House would be 50ft. long by about 24ft. wide, and from 12ft. to 15ft. high from the floor line to the apex; the height at the sides should be 6ft. This would admit of either a central or a side path arrangement inside. If a centre path were desired, beds could be formed on either side, for planting trees in or for standing them on, if grown in pots. A bed in the middle admits of more head-room for trees; but, in a house of the dimensions given above, a much better arrangement seems to be that of having a straight, neat path, made of gravel, from one end door to the other, a bed or border being on either side, then another narrow path for workmen to attend to watering, &c., and, finally, a border for dwarf trees round next the side sashes, and at the ends. Smaller span-roofed Houses, or those of another shape, would require a different arrangement; but these are, so far, only matters of taste, depending on the number and size of trees to be cultivated. Excellent fruits, particularly of Peaches and Nectarines, have been obtained from lean-to or half-span Orchard Houses; but these shapes do not admit of much head-room for trees in pots. The system of culture is of more importance than the form of house, yet the latter is of material help to the former; and the span-roof, having several points in its favour over any other shape, is, consequently, the one recommended.

Trees in Pots and Planted Out. Orchard Houses, in which it is desired to grow a variety of fruit-trees during spring and summer only, are best managed if the

Orchard House—*continued*

trees are grown in pots; a larger number may thus be accommodated in a given space than would be possible if they were planted out, and their portability allows them to be removed wherever desired, and to be placed up together in the winter. Planted-out trees do not require attention so frequently in watering; and, although this is an advantage, they are not so much under the command of the cultivators as if they were movable and their roots restricted. Pot-trees, on the other hand, depend very materially, for success or failure, on the attention given to watering. On an extensive scale, this means an enormous amount of work during the summer, as watering becomes necessary twice or thrice in a day. Manuring, by the application of a top-dressing of some rich compost and liquid manure, is also most essential in summer, in order to sustain health and fertility. It should be practised soon after the young fruits are set, and again when the second swelling begins. In the case of Peaches or Nectarines, a top-dressing should be composed of some rich manure and good loam in equal quantities; this should, if possible, be saturated with some liquid manure a few days previous to being used. Horse-droppings have proved an excellent ingredient for such composts, and so also has malt-dust. The mixture should be laid on the surface of the other soil to a depth of about 4in., and the inner part towards the tree left hollow for receiving the water supplied and preventing it from running away. Fruit-trees in pots require to be kept very nearly dry at the roots during winter, as, although the latter are seldom or never altogether at rest, they need being kept from undue excitement at this season. If the roots are kept saturated with water, ripening of the wood is but improperly effected, and, consequently, on the return of spring, many blossoms are imperfectly developed that would have been pushed forth had a system of withholding water in winter been practised. In the case of trees in large pots, especially of Apricots, Nectarines, and Peaches, there is seldom any necessity for watering at all between the beginning of November and the beginning of March, when the flower-buds will begin to swell or expand. It has already been stated that a sheltered place outside, in favourable parts of the country, will do, with proper coverings, for the winter, yet, for several reasons, Orchard-house trees are best kept under glass, if space can be afforded them in a structure where fire-heat is not allowed. Exposure to severe weather is ruinous to them. The pots would require a covering of bracken or dry litter all the same, to prevent their being burst by frost, should it be severe enough to reach them. Pot culture, in an Orchard House, has also another advantage, inasmuch as a greater variety can be grown in a given space, and if any sorts are found unworthy of having special treatment afforded to bring their fruit to perfection, they can readily be discarded, and their space re-occupied by other pot-trees of superior merit. It is most important that no roots be allowed to pass through the bottom and establish themselves in a border; consequently, provision should be made for preventing this, by placing two bricks together, and standing the pots on them.

Potting, or re-potting, of Orchard-house trees should be attended to soon after the fruits are gathered, and before the leaves drop. A large heap of soil should be prepared beforehand, where there is much to be done, and allowed, after being well mixed, to remain for a few days—or weeks, for that matter. It should be composed of about two-thirds loam, rather tenacious preferred, the other portion being well-decomposed manure. To this may be added, with advantage, some sifted brick and mortar rubbish, or chalk, particularly for stone fruits, and

Orchard House—*continued.*

sufficient bone-dust or fine horn-shavings to be visible when the bulk is mixed up. Trees that are in large pots, and are healthy, do not absolutely need their balls disturbed every year, beyond removing some old soil off the surface, and replacing it with new. Whenever the drainage is defective, or the roots or soil in bad condition, the trees should be taken out, their balls reduced with a pointed stick, and replaced in clean, properly-drained pots of a similar, or, maybe, even a smaller, size. Sufficient space must be allowed above the ball for the large quantity of water required in summer, and the soil should be rendered firm with a stout hand-rammer. When top-dressing only is intended, it may be practised in October with a stronger compost than that described above for potting, namely, more manure in proportion to the loam used; but a general overhaul is recommended earlier in the season, and new drainage, clean pots, and fresh soil supplied to the old (reduced) balls, with only few exceptions. Water should be given very sparingly after re-potting, until the injured roots shall have recovered somewhat the check experienced; it is most important, however, that the compost, when used, be suitably moist and workable. Before the flower-buds are so far expanded in spring as to show their colour inside, it will be advisable to stand the trees apart, as, if this is delayed, there is great danger of a large number of the former getting broken off. This appears a small matter to refer to; yet, from its apparent unimportance, it is frequently neglected, and many blossoms become broken off in consequence. It is almost an impossibility to separate entangled branches without such a result.

Thus much having been said respecting the culture of Orchard-house trees in pots, a reference may now be made to those planted out in a similar structure. First, it will be necessary to prepare borders of soil suitable for fruit-trees, instead of those of almost any description, which might answer well enough for pots to stand upon. It is unnecessary to make borders of a great depth; 2ft. of soil above the drainage is usually quite sufficient for such trees as may be recommended for planting out, such as Apricots, Peaches, and Nectarines. The soil for borders must be somewhat tenacious, and not be made over rich with manure. It should be rendered quite firm, by being rammed a few days after the trees have been planted and watered. It is important that fruit borders in Orchard Houses be allowed to remain firm and hard on the surface; the latter should not be broken, except being very slightly forked, in spring, to admit water all over alike. Surface roots are numerous on healthy trees, and they must not be broken off in spring, or there will be a great risk of the flowers dropping off, instead of setting. Mulchings of manure, or top-dressings, may be applied to planted-out trees, in summer, if they have heavy crops, and need help; but both should be avoided if there is evidence of the branches or shoots being already too vigorous, and, consequently, not likely to ripen well. Standard trees are, generally, best suited for planting out; those of pyramidal shape are soon liable to become uneven, because of the sap flowing more towards the upper branches and shoots, making them too gross, and rendering the lower ones weakly. This latter style of training is most successfully practised in pots, and, if standards are to be accommodated in borders, they should be sufficiently wide apart to admit of some pot-trees being arranged between. Standard Peaches and Nectarines are not, as a rule, very satisfactory, unless their heads are kept under proper management, and the shoots thinned so as to admit sun and air amongst them for properly ripening and colouring the fruit. Pear or Apple-trees are apt to grow too vigorously for planting in an Orchard House; their roots should be restricted in large

Orchard House—*continued.*

pots. Apricots succeed well as standards in Orchard Houses. The border, when prepared for them, should have a small portion of chalk intermixed, and some would also be of service to trees of the Peach and Nectarine. The soil should be made very firm, by treading and ramming, and, above all, should not be disturbed afterwards more than what is really necessary for getting water to soak in properly.

Methods of Training for Orchard-house Trees. The two kinds of fruit favoured, perhaps, most extensively with Orchard House protection, are Peaches and Nectarines. It has already been stated that, for planting in borders, standards or half standards, according to the height of the structure, are best suited for these fruits, and also for Apricots. The two first-named may be grown in pots as pyramids, or as bushes, the Apricot in pots being best adapted for the latter shape, or as a half standard. Cherries are most important Orchard House fruits, at least, if compact-growing sorts are selected, and they are worked on the Mahaleb stock, which induces a dwarf habit. The form of Cherry-tree most eligible either for planting or pot culture, is the pyramid. Plums of the finer dessert varieties are well worthy of glass protection, previous to, at the time of flowering, and throughout the season, in unfavourable districts. In warm parts, the trees are best to be placed outside, in a sheltered position, after the fruits are set. The fruits are considered superior if they can be properly ripened in the open air; but, should this be impracticable, the trees may be kept under glass, and subjected to free ventilation. It is when the trees are in flower that prospects of a crop are so frequently blighted by the havoc generally resulting from frost, rough weather, or a continued low temperature at that season. Pears are under the same disadvantage as Plums, and they succeed, under similar treatment, in Orchard Houses. Trees of both are best adapted for training in pyramidal form, and Pears are most fertile, and best suited for pot culture, when worked on Quince stocks. None but good varieties should be accommodated in an Orchard House, as considerable labour is incurred in potting, watering, and supplying all other requirements throughout the year. Apples also come under Orchard House fruits, as many of the good, yet somewhat tender, varieties, have been most successfully grown under glass, and the superior quality of the fruit obtained, compared with that of a similar sort from outside, has been favourably marked in respect of size, colouring, and flavour. Apples from trees grown under glass are readily distinguished, in an autumn exhibition, from all that have not been so favourably situated. This tree, like those last-named, succeeds in pots as a pyramid, preferably on the Paradise stock. Figs are sometimes included in Orchard House fruits; but they are best if provided with a higher mean temperature, and a house or compartment to themselves. A tree which should, if possible, be accorded a place along with Apricots, Peaches, &c., is the Mulberry. A good-sized standard of this in a tub will occupy but little space, and it will fruit abundantly, and the produce be far superior to any usually procured from the open air. Judicious summer pinching is most important in the training of Orchard House trees in pots, or of those planted out. Cordons are sometimes very useful, where space is limited, as excellent fruits are frequently obtained from trees of that form. Maiden trees can only properly be trained into the desired shape by people somewhat experienced in the art; yet sufficient knowledge may soon be obtained, by practice and observation, to supply all the attention necessary for preserving a fairly even balance afterwards. Summer pinching of the leading shoots may be practised twice, or even three times, in a year, to induce a compact habit. Cordon

Orchard House—*continued.*

trees may be pinched to three leaves or joints; bushes and pyramids may be allowed from four to six. Overcrowding must specially be prevented, otherwise sunshine, light, and a free circulation of air, are much impeded, to the detriment of the fruits, if there are any, or, at any rate, to the proper ripening of the shoots for the following year. Young trained trees of all sorts, suitable for culture in Orchard Houses, may be purchased from nurserymen who make such things a speciality, already established in pots, and set with blossom buds. Pruning may be performed in early spring, but it will not amount to very much, if summer pinching has been properly attended to, beyond thinning, and removing weak and superfluous shoots.

Airing and Temperatures. The Orchard House, above all other garden structures, should be provided with plenty of ventilation. This matter has already been referred to, but may receive a further notice. A span-roofed house, for the purpose named, should, preferably, run north and south; consequently, the side next the east will need to be carefully managed when cold winds from that quarter prevail, and there are any blossoms or tender foliage. In winter, the house, supposing the trees are inside, should be kept wide open whenever the temperature is above the freezing point. In spring, under such treatment, the trees will naturally move somewhat earlier than they would outside, yet they must never be unduly excited. A night temperature of 40deg. will be high enough, or even less than this, if the weather is severe. It should be remembered, that a confined atmosphere is more destructive to fruit blossoms under glass, particularly Apricots, Cherries, Plums, and Pears, than even a little frost. A circulation of air should, therefore, always be maintained, by leaving the ventilators open, more or less, night and day, according to the weather, until the fruits are properly set. Pears and Plums especially require a dry atmosphere, and plenty of air, to insure their setting freely. If fire-heat is at command, it will prove of immense advantage at this season, should frost or very dull weather prevail, yet it must be most cautiously applied, or more harm than good may result. By the time all the fruits are properly set, the season will have considerably advanced, and more solar heat will be procurable. This must be taken full advantage of, by closing early in the afternoons, with the exception of a little ventilation, which should be always kept on. In summer, early attention must be given to airing each fine morning, and the greatest possible amount of air be gradually admitted during the hotter portion of the day. No fixed scale of temperatures for the summer need be given, as it would be unnecessary to attempt following it in dealing with fruit-trees in Orchard Houses. The sun usually supplies sufficient heat after the end of April or May, without the use of hot water; and it is left for the cultivator to moderate its, at times, overpowering influence, by the admission of air, and the application of water about the house, and to utilise and conserve its valuable properties, by nearly closing the structure each day when the sun's power has sufficiently declined.

Syringing is an important point to be attended to in the culture of Orchard-house trees. From the time the fruits are safely set, until they begin to ripen, each tree should be thoroughly syringed, both in early morning and in the afternoon, except at times when experience and the weather suggest omissions. The water used should be of a similar temperature to that of the house, and it should be applied—preferably through a garden engine—with considerable force, after the foliage gets strong enough to withstand it. So soon as the fruits are gathered, pot trees may be stood in a sunny position outside, to thoroughly ripen their wood. They must, however, receive an equal amount of attention, in

Orchard House—*continued.*

respect of watering, &c., as before. Trees planted under glass must have all the exposure possible.

Insects. Orchard-house trees seldom escape the attacks of several most destructive insect pests. No sooner are leaves developed, than Green or Black Aphides appear; sometimes the latter are to be seen first on the wood, or fruit blossoms. Fumigation, on two or three successive evenings, will dislodge these pests; but this must only be practised previous to, or after, the trees have flowered. Red Spider is invariably found, in greater or less quantities, on fruit-trees under glass. It can be kept in check by the frequent syringing already recommended, both beneath and above the leaves, but seldom altogether destroyed by any available application. Brown Scale is also frequently to be seen on fruit-trees; it fixes itself in crevices, and on the bark, and can best be destroyed by hand-washing, or scrubbing with a rather strong solution of soft-soap water.

ORCHESTES (Spring Weevils). The name given to a genus of *Curculionidæ* (small beetles) that, at times, do great harm to Beech-trees and hedges, and, in a less degree, to Oaks, and to a few other trees. They are usually about ⅛in. long, but may vary from 1/10in. to ¼in., and, in colour, are reddish, brown, or black. The body is nearly oval; the head is small, and the beak about as long as the thorax, and strongly bent downwards; the antennæ are situated near the base of the beak, and are eleven-jointed and elbowed, with the club oblong-ovate. But the most ready means of recognising them is their power of leaping, which is given by the great size of the thighs of the last pair of legs. The enlarged thighs contain correspondingly powerful muscles, and the beetles, when touched, leap surprising distances.

Mode of Life. Those that survive the winter eat their way into buds, and the females lay their eggs alongside the midribs, on the lower surface of the leaves. The larvæ burrow into the leaves, and there form large galleries or patches between the surfaces, and in these change to pupæ, from which the beetles soon emerge. A severe attack by these insects on any kind of tree or shrub causes the leaves to become prematurely withered, or even useless, and considerably injures the health of the plants.

Remedies. In the mornings, shake the beetles off the plants, over a tarred vessel, from which they cannot escape, and pick off and destroy the leaves that show mines of the larvæ. Of course, both methods are applicable only to small trees. Very little can be done to limit the injury to forest-trees; but of these we are not treating here. The most hurtful insects in this genus are: *O. Fagi*—a small species (1/10in. long), black, with a faintly reddish, less often greenish, thin coating of short hairs, limbs paler, thighs one-toothed—often very abundant in June and July on Beeches; and *O. Quercus*—which is larger (⅛in. to ⅛in. long), of a dull brick-red colour, slightly hairy, eyes black, wing-cases with a large triangular ashy patch over their place of meeting at the base, thighs of front legs each one-toothed, of hinder pair each with a double row of six or seven spines—frequent on Oaks. Others occur on Alder, Hazel, Elm, &c., but do not call for a longer notice.

ORCHIDEÆ. A very large order of monocotyledonous plants, and one of the most natural families of the vegetable kingdom. Herbaceous terrestrial perennials, with tuberous or fascicled roots; epiphytes (with or without pseudo-bulbs), found generally growing on the trunks of trees, to which they attach themselves by their long adventitious roots; or saprophytes. Flowers solitary, spicate, racemose or paniculate; perianth superior, irregular, of six coloured segments, the three outer (the sepals) nearly similar, free, or the two lower ones

Orchideæ—*continued.*

connate (*Cypripedium*), or all three coherent (*Masdevallia*); the inner lateral (the petals) similar; the third inner segment (the lip) originally superior, but afterwards becoming inferior by the twisting of the pedicel, dissimilar, usually larger, extremely varied in shape and colouring, frequently spurred (*Angræcum*, &c.) or pouched (*Cypripedium*); stamens united with the style into a column, usually one opposite the upper sepal, sometimes two (*Cypripedium*) opposite the two lateral petals; anther two-celled (or one-celled by absorption of the septum), or four-celled by more or less perfect secondary septa; pollen agglomerated into two, four, or eight, pear-shaped, usually stalked masses (pollinia), lodged in the membranous pockets of the anther, and composed of grains, usually collected by fours into numerous groups, cohering by means of elastic filaments, or gathered round a cellular axis; grains sub-pulverulent, easily separable, or agglutinated into a solid, compact, waxy tissue; pollen-masses sometimes free, usually fixed, either directly or by means of a pedicel (caudicle), to a viscous gland (retinaculum), which may be exposed, or inclosed in one or two pouches; ovary inferior, often long, and twisted, one-celled (more rarely three-celled), trigonous; style often terminating in a beak (rostellum) at the base of the anther, or between its cells; stigma a viscid surface facing the lip, beneath the rostellum; seeds innumerable, very minute, fusiform; testa very lax-reticulate and albuminate. Leaves sheathing at the base, glabrous, rarely velvety (*Eria*), very firm in texture (*Cattleya*), or membranous (*Liparis*), cylindric (*Brassavola*), linear (*Isochilus*), or linear-lanceolate, usually entire or emarginate, as in *Vanda*, or some Angræcums, fan-shaped (*Pogonia*) or heart-shaped (*Listera*); nerves parallel, rarely reticulate (*Dossinia*, &c.), now and then developing buds on their surfaces, as in some Spiranthes and Malaxis. Stem or scape usually simple, cylindric or angular, often leafless. According to the authors of the "Genera Plantarum," there are 334 genera and about 5000 species; in that work, these are divided into five tribes, the principal distinguishing characteristics of each being here given.

TRIBE I. EPIDENDREÆ. Anther one, dorsal, operculate, usually incumbent, with the cells distinct and parallel; pollinia waxy, in one or two series, parallel, two to four in each series (one to four in each cell), free, or joined in each cell by a little viscous substance, or a granular appendage, very rarely attached to the rostellum. This tribe contains eighty-eight genera, and is divided, by Bentham and Hooker, into nine sub-tribes; it is represented, in both hemispheres, by both terrestrial and epiphytal genera, and includes some of the most beautiful garden plants: *Calanthe*, *Cattleya*, *Dendrobium*, *Lælia*.

TRIBE II. VANDEÆ. Anther one, dorsal, operculate, incumbent, or applied to the rostellum; cells most frequently confluent; pollinia waxy, usually two or four, applied to each other in pairs, posterior and anterior. *Vandeæ* is divided into nine sub-tribes, and contains 129 genera, the great majority being epiphytes. This group is represented almost in equal numbers in tropical Asia and America; there are many members in Madagascar, few in Africa, and very few beyond the tropics. Familiar examples are: *Aerides*, *Odontoglossum*, *Oncidium*, *Phalænopsis*, and *Vanda*.

TRIBE III. NEOTTIEÆ. Anther one, posterior, operculate, or erect and persistent; cells distinct, parallel; pollinia granular, powdery, or sectile. Stems without pseudo-bulbs. There are six sub-tribes of *Neottieæ*, and eighty-one genera, nearly all of which are rhizomatose terrestrial plants—*Vanilla* is sub-epiphytic. They have erect, simple stems, which are leafy at the base, or are quite leafless. *Neottieæ* are represented in both hemispheres, a considerable number being extra-tropical. Examples are: *Anæctochilus*, *Pogonia*, *Sobralia*, *Vanilla*.

Orchideæ—*continued.*

TRIBE IV. OPHRYDEÆ. Anther one, posterior, erect, prostrate, or reflexed, with parallel or divergent, distinct cells adnate to the clinandrium, and often continuous with the rostellum; pollinia granular, produced into a caudicle in each cell. There are thirty-two genera of *Ophrydeæ*, divided into four sub-tribes. All are terrestrial plants, with tuberous roots, the largest number of genera being found in South Africa, and but few in the tropics. The species are, perhaps, most numerous in the Mediterranean region. Examples are: *Aceras*, *Disa*, *Ophrys*, *Orchis*.

TRIBE V. CYPRIPEDIEÆ. Anthers two, lateral; the rostellum prolonged into a shield between the anthers; pollen powdery. This tribe contains but four genera, only two of which, *Cypripedium* and *Selenepedium*, are in cultivation; the first is widely distributed over the temperate and tropical regions of both hemispheres, the latter being confined to the mountainous regions of South America. The two genera not in cultivation, *Apostasia* and *Neuwiedia*, are respectively limited to tropical Asia, and Australia and tropical Asia. All four are terrestrial herbs.

Linnæus, in the middle of last century, only knew about a dozen exotic orchids, whereas now, probably, half the known species are, or have been, in cultivation in this country. By far the larger number inhabit tropical forests; they become less plentiful in temperate regions, and are almost absent from very cold ones—perhaps not more than two or three enter the Arctic Circle. They vary exceedingly in size; the Javan *Galeola altissima*, which has been said to be the largest known orchid, attains a length of more than 100ft.; but a Vanilla has been seen under cultivation with a stem even longer than this. *Drymoda picta* is one of the smallest of Orchids; it has a dull green, small, disk-like pseudo-bulb, from which springs a minute and very deciduous leaf. *Angræcum funale*, and some other species of the same genus, as well as some of the African Vanillas, are quite leafless, and depend upon the chlorophyll present in the strap-like roots of the first-named, and in the long stems of the latter genus.

Scarcely any natural order of plants is more free from fungoid attacks than are *Orchideæ*; for what is known about the fungi which have been observed on cultivated Orchids, the reader is referred to a paper by Mr. Worthington G. Smith, in the "Gardeners' Chronicle" (n. s., xxiv. p. 693). This volume also contains an account, by Professor Westwood, of the various phytophagous insects which have been found on imported Orchids. Among some of the other important results of the Orchid Conference of 1885, may be specially mentioned the paper on the Hybridisation of Orchids, by Mr. H. J. Veitch. This also is published in the "Gardeners' Chronicle" (n. s., xxiv. p. 628), and is illustrated by figures of seeds and seedlings of *Cypripedium*, *Dendrobium*, and *Phalænopsis*.

"Of the few orchids which are of use to man, the Vanillas (*Vanilla claviculata*, *planifolia*, &c.) hold the first rank. They are sarmentose plants, natives of the hot and damp regions of Mexico, Colombia, and Guiana [and tropical Africa]. Their fruit is a fleshy, long capsule, and the black, globose seeds are enveloped in a special tissue, which secretes a balsamic oil; if kept in a dry place, the capsule becomes covered with pointed and brilliant crystals of benzoic acid, and imparts its delicious perfume to various delicate dishes, chocolates, liqueurs, &c. The Faham (*Angræcum fragrans*) is a native of Bourbon; its leaves, known as Bourbon Tea, taste of Bitter Almonds, and smell like Tonquin Beans; they are used to stimulate digestion, and in pulmonary consumption. Salep, which is imported from Asia Minor and Persia, is produced by the tubers of several species of *Orchis*, which are equally natives of Europe (*O.*

Orchideæ—*continued.*

mascula, Morio, militaris, maculata, &c.). Salep contains, in a small volume, an abundance of nutritive starch, associated with a peculiar gum, analogous to Bassorine; it was formerly considered a powerful analeptic; it is now used as a sweet, scented jelly, or mixed with chocolate. The root of Helleborine (*Epipactis latifolia*) is employed for arthritic pains; those of *Himantoglossum hircinum, Spiranthes autumnalis,* and *Platanthera bifolia,* are reputed to be aphrodisiac. The flowers of *Gymnadenia conopsea* are administered for dysentery; and, in North America, the tubers of *Arethusa bulbosa* are used to stimulate indolent tumours, and in toothache. The root of *Spiranthes diuretica* is renowned in Chili. The rhizome of *Cypripedium pubescens* replaces the Valerian as an antispasmodic, in the estimation of the Anglo-Americans" (Decaisne and Le Maoût).

ORCHID FERTILISATION. The great source of information on this, as on so many other important and interesting questions in Natural Science, is to be found in the writings of Charles Darwin, who has written, upon this subject, the well-known work "On the Various Contrivances by which British and Foreign Orchids are Fertilised by Insects." This book must always be referred to by those who wish to understand the very curious structures that adapt many Orchids, in a very peculiar degree, to benefit by the visits of insects, while a smaller number are adapted for self-fertilisation alone. Not a little information is contained also in the works of Dr. Hermann Müller (of the chief of which a translation has been published, entitled "The Fertilisation of Flowers"), of Professor Asa Gray, of Delpino, and of many others, whom it is impossible here even to enumerate.

An endeavour will be made here to bring together some of the more interesting results arrived at by the various writers, [selecting a few of the more characteristic examples from the species native in Britain, and thereafter giving a short account of some exotic species that exhibit peculiarities not met with in British Orchids. The flowers of Orchids in general are very curious in form and arrangements of their parts. This is well seen in the many figures of Orchids that have appeared in this dictionary (*see* **Aceras, Aerides, Calanthe, Cattleya, Chysis, Cœlogyne, Cymbidium, Cypripedium, Dendrobium, Epidendrum, Masdevallia, Maxillaria,** and **Miltonia**).

But, despite this diversity, it is never difficult to recognise, that each flower is supported on a stalk, twisted half round, and that, when cut across, there are very many ovules visible in the stalk, and that this part really encloses the ovary, which is, therefore, inferior, and consists of three carpels, joined usually along their edges only. The flowers show six parts externally, viz., three sepals, much alike, and three petals, of which the lower one, in the mature flower, is almost always larger, broader, and more handsomely coloured than the others, and is called the labellum. It is often peculiar in form also, and very frequently it ends in a spur, which projects backwards, as the nectary. This latter, frequently, does not exude nectar into the tube, but contains it in the thin cells lining the latter; the walls of these cells are so thin as to allow insects (even moths) to pierce them readily, so as to obtain the juice. The tube is often nearly absent, but it is often of great length, and permits the honey to be secured only by insects with long probosces (such as some moths and butterflies possess), or by boring holes from without, as humble bees often do. This latter method, of course, does not benefit the flower at all. The essential, or reproductive, organs in the flower, consist of the stigmas and the fertile stamen, or, in *Cypripedieæ*, the two fertile stamens, and the remains of two stamens, or of one stamen reduced to the state of a staminode,

Orchid Fertilisation—*continued.*

i.e., of a stamen no longer of use in forming pollen, but modified to perform some other function for the welfare of the plant. The relation of the larger parts of the flower to one another, will be more easily understood

FIG. 762. FLOWER OF LÆLIA ALBIDA.

from the accompanying woodcut of the flower of *Lælia albida* (see Fig. 762). The sepals are the three narrower parts, situated behind, and overlapped by, the three petals, of which the lower in the figure is the labellum or lip. The dark, central spot is the opening of the nectary; and the upper part of the spot, is the situation of the stigmas. In Orchids, only two of the three are developed as stigmas, and often—in fact, usually—they unite. Just above the dark spot is seen the column, united to the labellum by two ridges. This column is regarded as formed by the fusion into one body of the upper part of the carpels, the fertile stamens, whether one or (in *Cypripedium*) two, and probably three or (in *Cypripedium*) two undeveloped stamens; but of the latter, as a rule, no clear trace remains. At the tip of the column is a body—the rostellum—usually regarded as the third stigma become useless as a stigma, but of great importance in securing the conveyance of pollen from one flower to the stigma of another. The labellum is also believed to be of compound nature, and to be formed of two metamorphosed stamens, and the median petal, closely united in growth.

The structure of the fertile stamen, and the process by which pollen is conveyed from it to the stigma of another flower, by insect aid, in a common British Orchid will next be described, selecting, as a widespread and easily-obtained plant, the Spotted Orchis (*Orchis maculata*). In this species, the perfect stamen is situated on the front of the column; and in the anther there are two pouches, in which the pollen grains are inclosed. The grains are joined together into small masses, and these, again, are joined to form a single mass (pollinium) in each chamber. Each pollinium is formed like a club, supported on a slender stalk (caudicle), which ends below in a round, sticky ball. The two

Orchid Fertilisation—*continued.*

balls lie almost side by side, and are covered by an elastic membrane formed by the rostellum. This membrane prevents the disks from drying, which would render them useless. It is at first continuous over the disks, but it soon tears across, and, on being touched, it is easily dragged down, leaving them bare.

When a suitable insect (*e.g.*, a moth) visits the flowers, and conveys the pollen of one flower to the stigmas of the next one visited, it pushes the proboscis down the tube of the labellum, and, in doing so, its proboscis, or its head, rubs against the membrane, and, depressing it, lays bare the sticky disks of the pollinia. These, as soon as they are touched, adhere to the part with which they are in contact, and, on the insect withdrawing its head, one or both of the pollinia are also withdrawn. They are erect when first withdrawn, but, in about half a minute, as the disks dry, the pollinia bend forward, and thus come to lie nearly alongside the proboscis, or other body, in the very

FIG. 763. CYPRIPEDIUM CALCEOLUS.

best position to bring them into contact with the stigmas of flowers visited later. Owing to the little interval that elapses before the pollinium is in the suitable position, the insect has usually visited all the flowers on a stem before any of the pollen could be left in flowers of the plant from which it was taken; hence, cross-fertilisation between different plants is favoured. When a pollinium touches a stigma, some of the small masses adhere, and are dragged off, and thus one pollinium suffices for several stigmas. Insects have frequently been taken bearing pollinia, and often several pollinia are found adhering to the proboscis and head of an insect.

O. maculata, like most of this family, remains barren if insects are prevented from visiting the flowers, and

Orchid Fertilisation—*continued.*

aid in transferring the pollen is not given. There is no means in this plant of conveying pollen to the stigma, without extraneous help, and the adaptations for cross-fertilisation are complete.

It may, therefore, be regarded as the type of a large section of Orchids, in so far as concerns its entire dependence on extraneous aid, though, in minor points, there is

FIG. 764. SINGLE FLOWER OF CYPRIPEDIUM SPECTABILE.

a considerable diversity in the methods of favouring cross-fertilisation; *e.g.*, in *O. pyramidalis*, the sticky disks are united into a concave band, which adheres to the proboscis of the insect visitors. The pollinia pass through the same change of position as in *O. maculata*.

Listera ovata, the "Twayblade," which is an inconspicuous, greenish Orchid, growing in grassy places, has the pollen masses lying immediately above the rostellum. The pollen masses are dry, and, therefore, cannot adhere of themselves to insects; but when the tip of the rostellum is touched, even very gently, by the insect, a drop of sticky fluid oozes out, and fixes the pollen grains

Orchid Fertilisation—*continued.*

in the suitable position to reach the stigmas of the next plant visited. The long, narrow, spurless labellum, secretes honey into a groove down the middle of the upper surface. The insect follows up this guide as it climbs up the labellum, and, on reaching the upper end of the groove, it is almost certain to touch the rostellum, and to have the pollen-masses affixed to its head. For a little the rostellum sinks, and closes the way to the stigmas; but soon it rises, leaving free access to the stigmas for later visitors to the flower. These visitors are attracted by a new supply of nectar in the groove. They are almost all small insects, with the proboscis short or absent, the nectar lying open. The genus *Cypripedium*—represented by *C. Calceolus*, the "Lady's Slipper" (see Fig. 763), a scarce species in England, and by many tropical species, *e.g.*, *C. spectabile* (see Fig. 764)—belongs to a group that possess two fertile stamens, situated at each side, on the lower surface, of a broad, shield-like plate (the representative of the single fertile stamen in other Orchids). This plate overhangs the stigmatic surface, which lies on a prominent overhanging rostellum immediately below the plate. The labellum is much like the front half of a slipper (see Fig. 764). It forms a chamber, open above, and large enough to allow small bees to enter. This they do readily, to gnaw the hairs that line the middle of the floor. The lips on each side are incurved, so that, when an insect wishes to escape by the opening, it cannot crawl out as it entered; nor is there room for it to fly out. But, at the stalk of the labellum, a small opening is left on each side, where, if strong enough, by squeezing between the labellum and the stigma, and then between the labellum and either stamen, the prisoner can escape, carrying away one of the pollinia. As the stigma is touched before the anther, the flower cannot be fertilised with its own pollen, but only with that from one previously visited. Few flowers are formed on each plant.

Among exotic Orchids, the adaptations for fertilisation by pollen from other flowers are far more curious and striking even than the above, and the peculiarities in form and structure of the rostellum, the pollinia, and other parts of the flower, are often very strange, and cause them to resemble insects (*e.g.*, in the Fly Orchis), or a minute dove, or other objects too numerous to describe, or even to mention.

Mr. Darwin has described fully some of the more remarkable, among which is the extremely curious genus *Catasetum*. In this genus of Orchids, the flowers are of different sexes, and they are so unlike that on *C. tridentatum* three supposed genera were based; the characters being drawn from the form of the flowers. These were *Catasetum*, based on the male; *Myanthus*, on the hermaphrodite; and *Monachanthus*, on the female flowers. The occasional presence of these flowers on the same plants has enabled botanists to understand their mutual relations. Cross-fertilisation must be effected before seeds can be formed; and this requires insect agency. In *Catasetum* (the male flower), the labellum rises up at the back of the flower (the ovary not making the usual half-twist), and is shaped like a monk's cowl. It contains no exuded nectar, but bees and other insects gnaw the inner surface greedily. The central column projects forward below the labellum, and bears the anther on its upper surface, the pollinia and disk being embedded in the tissues till set free by the mechanism now to be described. From each side of the rostellum grows a long, slender, curved horn,

Orchid Fertilisation—*continued.*

or "antenna"; and both lie within the hollow of the labellum. The right antenna occupies the bottom of the space, with its tip just projecting beyond the left margin; the left one curves upwards along the back of the labellum.

The slightest touch on either antenna immediately transmits some stimulus to the membrane over the disk of the pollinia, causing it to be rent; the disk springs out, by sudden removal of tension from the bent caudicle, and the whole mass is thrown forward, with the sticky disk in front, against the insect, if the antenna has been touched by an insect, and at once adheres in the position most likely to secure convey-

FIG. 765. FLOWER OF CATTLEYA BICOLOR.

ance to the stigma of the female flower. The pollinia are not sensitive to contact of insects with any part of the flower except the antennæ; but the position of these organs renders this contact almost certain to occur when the labellum is being gnawed. The female flowers of this species (formerly called *Monachanthus viridis*), resemble the male flowers in the position and general form of the labellum, which differs only in minor details. The column also agrees in position, but is smaller; the pollinia are rudimentary; the disk does not cohere with the pollinia, but soon falls away: and the antennæ are absent. On the other hand, the stigmas and the ovaries are developed, and the seeds ripen abundantly.

The form called *Myanthus barbatus* is very different in appearance from the other two, and Darwin points out that it comes near, in its structure, to the flowers of *Catasetum callosum* and of *C. saccatum*, but that it is hermaphrodite, though not known to seed. He suggests that it may be a reversion to the ancestral form. Owing to a bend in the ovary, the column and the long-fringed

Orchid Fertilisation—*continued.*

labellum have reversed the positions they occupy in the other forms. In the large group of *Epidendreæ*, of which so many are cultivated in hot-houses, the adaptations for cross-fertilisation, though less complex than in *Catasetum*, well deserve a short notice. *Cattleya* is selected as an easily-obtained type; but *Lælia*, *Chysis*, and other genera, only differ from *Cattleya* in minor details. The positions of the labellum and of the column will be readily made

FIG. 766. CATTLEYA TRIANÆ.

out (see Figs. 762, 765, and 766). The column is prominent, and arches forward, having the stigmas on the front or lower surface, near the tip. Just beyond them is the rostellum, the lower surface of which is thickly covered with sticky liquid. Beyond this, again, on the tip, is the anther. The pollen grains are joined to form four chief masses, which end in caudicles, to which many separate small groups, each of four grains, are stuck. The caudicles have no disks; they lie so that their tips are on the dry, membranous, upper surface of the rostellum. The labellum usually has the sides folded up so as to nearly surround the column. The nectary is a narrow tube between the labellum and the base of the column in front. When an insect of suitable size comes to suck the nectar, it must push its way between the labellum and the front, or lower, surface of the column;

Orchid Fertilisation—*continued.*

and must get well in below the latter before reaching the nectar. In doing this, its back presses against the stigmas, and leaves on them pollen from any previously visited flower. In retreating, the insect presses its back against the lower surface of the rostellum, and becomes smeared with the fluid, some of which is also forced on to the caudicles, and causes them to stick to the insect; and the pollinia are thus drawn out and fixed to it, to be transferred to the next flower visited. It will be observed that the method of affixing the pollinia in these plants reminds us a little of that previously described as occurring in *Listera ovata*; but the larger size renders it more easy to study the process in *Cattleya* and its allies, and the differences in details are sufficiently obvious.

Some Orchids are now so specialised to adapt themselves for cross-fertilisation alone, that the stigma dies (as if poisoned) when pollen from the same flower is placed on it; *e.g.*, species of *Burlingtonia* and of *Oncidium*. Between this extreme and habitual self-fertilisation in cleistogamic flowers, every stage is to be encountered. In many cases, where mechanical obstacles prevent the pollen of a flower being transferred to its stigma, the ovules are well fertilised (*e.g.*, in *Orchis maculata*) if pollen is placed on the stigma of the same flower.

An interesting example of the way in which an Orchid, possessed of structures intelligible in their origin only as suited to cross-fertilisation, is converted by a slight alteration, so as to enable its ovules to be fertilised by pollen of the same flower, is well seen in the Bee Orchis (*Ophrys apifera*). In this plant, the parts are, in many respects, similar to those of *Orchis maculata*; but the pollinia have long, slender, flexible stalks, and the mass of grains in each slips out of the pouch of membrane, and hangs in front of the stigma, retained by the disk, and the slightest swaying movement causes it to strike against the stigma, and to leave pollen on it. The flower is not much, if at all, visited by insects, and it possesses no attractions for them.

A striking anomaly is that observed by Dr. F. Müller, in South Brazil, in which an Epidendrum possessed two lateral stamens that secured self-fertilisation, and a median one, from which the pollen could be removed only by insect or other extraneous aid. The rarity with which this is effected, is indicated by the absence of attractions for insects in the flower. A considerable number of self-fertilised Orchids have been put on record. One of the latest papers on this subject is entitled, "On the Contrivances for Insuring Self-Fertilisation in some Tropical Orchids," by Henry O. Forbes, in the "Journal of the Linnean Society," vol. xxi., pp. 538-49, tt. 16 & 17.

ORCHID HOUSE. This term is applied to any garden structure in which Orchids are cultivated, to the exclusion of all, or nearly all, plants of another description. It is not necessary, nor, indeed, always thought advisable, to relegate these plants to certain houses by themselves; but in nurseries, where space for thousands of living imported specimens have frequently to be found, and a large collection of established plants is also grown, not only are special Orchid Houses found necessary, but large structures are frequently devoted wholly to the accommodation of such genera as *Cattleya* or *Odontoglossum* alone. Nor is this system entirely limited to nurseries; many private collections have now become so extensive, in consequence of the frequent additions made, that similar arrangements are being adopted. Where large and varied collections of Orchids are grown, they are usually arranged, according to the

Orchid House—*continued.*

amount of heat required, in three separate houses, or three compartments of one house having the heating arrangements fully under command. When only a mixed collection is grown, the several genera forming it must be afforded positions as favourable to their well-being as circumstances admit, and the temperature varied somewhat by giving a greater or less amount of ventilation in different parts of the house in which they are placed. The following are the names usually given to the three different Orchid Houses, or divisions referred to. Approximate temperatures for each, during summer and winter, are also subjoined, as a general guide for cultivators, and not with the intention of their being rigidly followed:

1. *East Indian House.* To this department are relegated all Orchids requiring the highest temperatures, such as those originally received from the Eastern, and also from the hottest parts of the Western, hemispheres. These plants need plenty of moisture in the air during their season of growth, and also a circulation of air, somewhat cautiously applied, to avoid sudden changes of atmosphere. Temperatures: Summer—day, 75deg. to 90deg., with sun; night, 70deg. to 75deg. Winter—day, 70deg. to 75deg.; night, 60deg. to 65deg.

2. *Brazilian and Mexican House.* This provides accommodation for Orchids which require an intermediate temperature, as, for instance, the bulk of the Mexican species and a number from Brazil, &c. These will succeed in a drier atmosphere, generally, than those already referred to, but shrivelling must not be allowed. Temperatures: Summer—day, 75deg. to 85deg., with sun; night, 65deg. to 70deg. Winter—day, 65deg. to 70deg.; night, 60deg.

3. *Peruvian House.* A division specially for cool Orchids, natives of the mountains of South America, India, &c., many of which never appear to have any fixed season of rest. They are best suited with a cool temperature, and a more or less genial, moist atmosphere all the year round. Temperatures: Summer—day, 60deg. to 70deg.; night, about 60deg. Winter—day, 50deg. to 60deg; night, 40deg. to 50deg., according to temperature outside.

The shape of structure most suitable for Orchid culture, generally, is a span-roof, or something very closely approaching it, such as a three-quarter span. Lean-to houses, with northern aspect, are well adapted for all the cool species and varieties of such genera as *Masdevallia* and *Odontoglossum*, in summer particularly, as these do not succeed in a high temperature, nor in houses where, from sun heat or other causes, the atmosphere is dry at any time of year. Where the ventilation is properly arranged and managed, cool Orchids may be grown as successfully in a structure of another shape as in a lean-to. A span-roofed Orchid House, about 60ft. long, 12ft. wide, and 8ft. high, would accommodate a large quantity of small plants, which could all be arranged on side stages, near the glass, or a large number might be suspended from the roof. The side walls should be carried about 4ft. or 4½ft. above the ground, and small doors or sliding ventilators inserted in them, about half-way up. The top ventilation should be effected by having a longitudinal flap, made to rise up from the inside, or by small sashes attached with hinges to the ridge, and arranged so as to open without admitting rain in wet weather. Running sashes on the roof, and side-sashes opening on a level with plants on the stages, should now be recognised as things of the past when new Orchid Houses are being constructed. If plants requiring various temperatures are to be grown in one house, a glass partition will be the most convenient way of dividing one part from the other, which might have more or less heat and air applied, as found necessary. The dimensions given above would only be suitable for a house in which small or moderate-sized plants were intended to be grown; for specimens of considerable growth, or for large collections, proportionate measurements to any extent might readily be taken to meet requirements. Side stages should be about 4ft. from the ground. A system of having a double staging is sometimes adopted with excellent results for Orchids, namely, a bed of ashes, shingle, coke, or breeze, is laid on slates, which are supported by upright iron pillars. This bed is continually kept moist, and an open woodwork staging is placed above, on which the plants are stood. In some of the best-arranged Orchid Houses, the plants stand over a water-tank, formed beneath the woodwork staging. Into this the rain-water from the roof is conducted, and is always close at hand for watering the plants. It is most important that only rain-water be used for this last-named purpose, if it can possibly be obtained. Orchid Houses should never be built so high that the plants, when arranged inside, will be very far from the glass, or situated so as not to receive a sufficiency of light, which the majority of them require. There are few Orchids, except, perhaps, the Mexican species, that are not benefited by shading in summer. This should not, however, be thick, neither should it be permanently fixed on the roof. A thin shading, sufficient to exclude bright sunshine, while, at the same time, admitting light, is best; it should be tacked on rollers, and kept up during dull weather.

General Remarks on Culture, &c. The special cultural requirements of all the important genera of Orchids being given elsewhere in this work, under their respective headings, it will be unnecessary to add more here than a few brief remarks of a general character. At one time, Orchids were limited to the gardens of a comparatively few wealthy owners, who took an especial interest in them, and spared no expense in obtaining such plants. The same conditions exist up till the present, in respect of rare specimens, or those of exceptional merit; but some representatives of the more popular genera are, fortunately, now found almost everywhere. This is mainly the result of enterprise, shown by sending collectors of plants to remote foreign lands, where Orchids abound, for the purpose of seeking new additions to the species, or varieties, already obtained, and for transmitting, in quantity, well-known and popular kinds, for distribution in this country. The method of culture, too, has been much modified, since it was found that the plants, in general, did not really require so much heat as what was, at first, thought necessary. Orchids are able (especially many of the strong-growing species) to withstand a considerable amount of ill-usage, compared with many other plants; otherwise, so many thousands would never reach this country and re-establish themselves in the way they do. Heat and moisture afford nearly all the plants need, consequently, the proper method of applying these is, at least, one of the main points in successful culture. Good fibrous peat, living sphagnum, and charcoal, form the principal materials necessary for the majority of Orchids. These are of more use for holding the plants in position, and retaining moisture for the encouragement of the tender roots, than for any particular nourishment afforded. It is remarkable how some attach themselves to a block of wood and succeed admirably with nothing else, save a little sphagnum and the proper attention in watering. Pots for Orchids should, with few exceptions, be quite half-filled with clean drainage, and they should be used as small as possible, in proportion to the size of plant. Shallow pans, made in various sizes, either for suspending from the roof or for standing on stages, have been used very extensively of late, with most excellent results. Orchid baskets should be made of teak wood, as it is hard, and lasts a long time. They may be purchased in

Orchid House—*continued.*

several sizes, ready for use. Blocks, or rafts, may also be made of teak, or pieces of tree-fern will frequently answer equally well. A moist atmosphere is most desirable for all during the summer, or growing season, and, as a rule, plenty of water at the root. The amount of rest necessary varies considerably, and can only be properly apportioned by experience with different genera or species; some (as already remarked) are seldom completely at rest. Heavy syringing is not recommended at any season: a very slight dewing over the plants may be advantageous in summer; but, further than this, the use of a syringe should be limited to distributing water amongst the pots for moistening the atmosphere. Cleanliness amongst Orchids, in every respect, is one of the main roads to success. Dirt on the plants, or the pots, in the drainage, or even on the beds beneath, will soon produce an evil effect on the healthy appearance that should, and generally does, characterise Orchids receiving proper attention.

Insects, &c. Orchids are subject to many insect pests, and to a much-dreaded disease called the "spot." This latter is considered to be encouraged, especially in winter, by a superabundance of moisture and by a stagnant atmosphere. White and Brown Scale, Mealy Bug, Yellow and Black Thrips, Red Spider, Yellow and Green Fly, are all included in the insect pests to the attacks of which the plants are at times liable. Sponging with weak soft soap or tobacco water is recommended for eradicating any of them: fumigating Orchids is a practice not to be approved of, as it undoubtedly causes injury at times. Cockroaches, Slugs, and Snails, must also be included amongst the enemies of Orchids.

ORCHIDIUM. A synonym of *Calypso.*

ORCHIS (the ancient name, from *orchis*, testiculus; referring to the two oblong tuberous roots of some of the species). Including *Anacamptis*, *Barlia*, and *Himantoglossum.* ORD. *Orchideæ.* A large genus (nearly eighty species) of hardy terrestrial orchids, natives of Europe, temperate Asia, and North Africa, with two North American, and two in the Mascarene Islands. Many of them are interesting and curious rather than showy. Flowers in dense or loose, sessile spikes, or in very short, pedicellate racemes; sepals and petals nearly equal; lip three (rarely four or five) lobed, larger than the petals, hanging down anteriorly between the lower segments of the calyx, and extended in the form of a spur; anther confluent with the column, cells two, diverging at the base; pollen-glands in a common pouch. Stem erect, herbaceous, leafy at the base. The few species worth cultivating thrive best in a deep rich soil; those which naturally prefer chalky soils should be planted in one of similar nature. They are very impatient of disturbance at the roots. Propagated by division. Transplanting should only be performed during the autumn months, when the growth of the young roots will have fully matured.

O. foliosa (leafy).* *fl.* purple, numerously disposed in an ovate or oblong-ovate spike, about 9in. long and 3in. broad; sepals erect, ovate, blunt; petals similar in form, but narrower and smaller; lip pendent, very broad, three-lobed, much longer than the spur. May. *l.* unspotted, oblong, lower ones blunt. *h.* 1½ft. to 2½ft. Madeira. A very desirable plant, varying a little in size of inflorescence and colour of flowers. (B. M. 5074; B. R. 1701.)

O. fusca (brownish). A synonym of *O. purpurea.*

O. hircina (goat-scented). Lizard Orchis. *fl.* dirty greenish-white, with a disagreeable smell, large, remarkable for their long, linear lip; sepals converging over the column; petals small; spike dense, 4in. to 8in. long. Summer. *h.* 1ft. to 2ft. Europe (Britain, East Suffolk and Kent; almost extinct), North Africa. See Fig. 767. (Sy. En. B. 1448.)

O. h. romana (Roman). In this variety, the lip is rosy-purple. Rome, 1871.

O. lactea (milky). *fl.* purple; sepals very acuminate; lip three-parted, very glabrous, equalling the incurved spur. May. *l.* oval, acute, cuspidate. Barbary, 1815. (B. M. 1932.)

O. latifolia (broad-leaved).* Marsh Orchis. *fl.* purple or red; lip convex, crenate, slightly three-cleft; spur conical; spike dense, many-flowered. June. *l.* lanceolate, broadest near the middle, usually spotted with purplish-black. Stem about 1ft. high. Europe (Britain), Asia. (F. D. ii. 266; Sy. En. B. 1458.)

Orchis—*continued.*

FIG. 767. FLOWER OF ORCHIS HIRCINA.

O. l. lagotis (hare's-eared). A variety having purple flowers, with darker bands on the lip. Alps of Piedmont, 1869.

O. laxiflora (loose-flowered). *fl.* bright crimson-purple, in a very loose spike, 3in. to 10in. long. Summer. *l.* lanceolate or linear-lanceolate, 3in. to 6in. long, not in a rosette. *h.* 1ft. to 3ft. Europe (Guernsey and Jersey, in wet meadows), 1820. (Sy. En. B. 1456.)

O. longibracteata (long-bracted). *fl.* purple; sepals very obtuse; lip fleshy, crisped at base, four times as long as the thick, conical spur; laciniæ obtuse, crenate; bracts exceeding the flowers; spike long, many-flowered. May. *l.* oblong, narrowed at base. Sicily, 1818. (B. R. 357.)

O. longicornu (long-horned). *fl.* purple, disposed in dense spikes, 6in. to 8in. long; lip striped with lilac. May. *h.* 12in. to 20in. North Africa, 1815. A very handsome species. (B. M. 1944; B. R. 202; S. B. F. G. 249.)

O. longicruris (long-shanked). *fl.* pale purple, in a thick, sub-corymbose spike; sepals acuminate; lip thrice as long as the incurved spur; laciniæ all linear, acuminate. May. *l.* oblong-lanceolate, undulated, obtuse. Europe. (S. F. G. 927; B. R. 375, under name of *O. tephrosanthos undulatifolia.*)

O. maculata (spotted).* *fl.* pale purplish or whitish, variously spotted with purplish-brown, and disposed in an ovate spike; lip flat, crenate, three-lobed; spur cylindrical, shorter than the germen. June. *l.* lanceolate, spotted with purplish-brown. Stem 1ft. high, slender. Europe (Britain), Asia. (F. D. vi. 933; Sy. En. B. 1459.)

O. mascula (male). *fl.* rich purple, disposed in a rather loose spike; the two lateral sepals reflexed upwards; lip four-lobed, crenate, having the disk white and spotted. Spring. *l.* chiefly radical, elliptical or lanceolate, usually spotted with black. Europe (Britain), North Africa, and West Siberia. (F. D. iii. 457; Sy. En. B. 1455.)

FIG. 768. FLOWER OF ORCHIS MILITARIS.

O. militaris. Military Orchis. *fl.* numerous, in a dense, oblong spike; sepals usually purple, converging over the petals and column in the shape of a helmet; lip longer, paler, more or less spotted with purple, four-lobed; spur not half the length of the ovary. Spring. *l.*, lower ones broadly oval to oblong. Tubers entire. *h.* 1ft. to 2ft. Southern England. See Fig. 768. (F. D. viii. 1277; S. B. F. G. 163; Sy. En. B. 1452.)

O. Morio (buffoon). *fl.* six to eight, in a loose spike; sepals purplish, arching over the smaller petals and column in the form of a helmet; lip pinkish-purple, pale purple in the middle, with darker spots; spur obtuse, nearly as long as the ovary. Early summer. *l.* few, almost radical, and two or three sheathing scales higher up the stem. *h.* 6in. to 8in. Europe (Britain), West Asia. (F. D. ii. 253; Sy. En. B. 1454.)

Orchis—*continued.*

O. pallens (pale). *fl.* pale yellow; sepals ovate, obtuse; lip round, with three entire lobes; spur twice as long as the lip; spike dense, oblong. May. *l.* obovate-oblong, very obtuse. *h.* 9in. Europe, 1825 (B. M. 2569, under name of *O. sulphurea*; J. F. A. 45.)

O. papilionacea (butterfly). *fl.* purple; sepals oblong, acute; lip crenulate, unguiculate, equalling the conical, incurved, pendulous spur. April. *l.* linear-lanceolate, acute, closely sheathed. *h.* 1½ft. Rome, 1788. SYN. *O. rubra.* (B. R. 1155, and S. F. G. 928.)

O. pauciflora (few-flowered). *fl.* yellow, spicate; lip darker, and sometimes spotted. *l.* linear-lanceolate. Italy, &c., 1844. (R. G. 1149, Fig. 2.)

FIG. 769. ORCHIS PURPUREA, showing Habit, and (1) Front and (2) Side View of detached Single Flower.

O. purpurea (purple).* *fl.* ¾in. across; sepals and petals green and purple outside, paler inside, spotted; lip pale rose, spotted with purple; spikes usually large, many-flowered. May. *l.* oblong-obtuse, 3in. to 5in. long. Britain. SYN. *O. fusca.* See Fig. 769.

O. pyramidalis (pyramidal). *fl.* rich rose or purplish-red, remarkable for their slender spur, longer than the ovary; sepals lanceolate, spreading; petals converging over the column; lip broad, three-lobed; spike dense, 2in. to 4in. long. Summer. *l.* lanceolate, usually narrow, and pointed. Stem 1ft. or more high. Tubers pointed. Europe (Britain), North Africa. SYN. *Anacamptis pyramidalis.* (F. D. xii. 2113; J. F. A. 266; Sy. En. B. 1449.)

O. rubra (red). A synonym of *O. papilionacea.*

O. sambucina (Elder-scented). *fl.* yellow or purple, in a dense oblong spike; sepals slightly obtuse; lip obsoletely trilobed; spur pendulous, inflated, twice as long as the lip. April. *l.* ovate-oblong, very obtuse. *h.* 9in. Europe, 1825. (J. F. A. 108; S. B. F. G. 199, under name of *O. Schleicheri.*)

O. Schleicheri (Schleicher's). A synonym of *O. sambucina.*

O. spectabilis (showy). *fl.* few, on a four-angled scape; sepals and petals all lightly united to form the vaulted galea, or upper lip, pink-purple; the ovate, undivided lip white. May. *l.* two, oblong-obovate, shining. *h.* 4in. to 7in. United States, 1801. (L. B. C. 78.)

O. sulphurea (sulphur). A synonym of *O. pallens.*

O. tephrosanthos (ash-colour-flowered). *fl.* purple, variegated, in a thick, cylindrical spike; sepals acuminate; lip twice as long as the incurved spur; laciniæ linear. April. *l.* oblong-lanceolate, slightly acute. (B. M. 3426.)

O. tridentata (three-toothed). *fl.* pale purple, in a corymbose spike; sepals very acuminate; lip equal to the spur; laciniæ denticulate. May. *l.* oblong-lanceolate, acute. *h.* 9in. South Europe, 1818. (B. R. 367.)

O. ustulata (scorched). *fl.* in a dense spike, the deep purple of the unexpanded ones imparting a burnt, or scorched, appearance; sepals deep purple, pointed, converging over the column and the small, narrow petals; lip white, purple-spotted, four-lobed; spur very short; spike 1in. to 2in. long. Spring or early summer. *l.* few, oblong or lanceolate. Tubers entire. *h.* 6in. to 8in. Europe (Britain), West Siberia. (Sy. En. B. 1450.)

ORCHIS, BEE. *See* **Ophrys apifera.**

ORCHIS, FLY. *See* **Ophrys muscifera.**

ORCHIS, HUMBLE-BEE. *See* **Ophrys bombilifera.**

ORCHIS, LIZARD. *See* **Orchis hircina.**

ORCHIS, MARSH. *See* **Orchis latifolia.**

ORCHIS, MILITARY. *See* **Orchis militaris.**

ORCHIS, SPIDER. *See* **Ophrys aranifera.**

ORELIA. A synonym of *Allamanda.*

OREOCHARIS (of Decaisne). A synonym of **Mertensia** (which *see*).

OREOCOME. Included under **Selinum** (which *see*).

OREODAPHNE. A synonym of **Ocotea** (which *see*).

OREODOXA (from *oreos*, a mountain, and *doxa*, glory; referring to the lofty stature of some of the species). ORD. *Palmeæ.* A small genus (five species have been described) of elegant, unarmed, stove, tropical American palms, with slender, ringed stems, bearing large, terminal leaves, with long, sheathing stalks, forming a cylinder around the summit. Flowers white, small, monœcious, the spikes inclosed in double, somewhat woody spathes. Fruit ovoid or oblong-ovoid. Leaves equally pinnatisect; segments narrow, linear-lanceolate, narrowed at apex, unequally bifid, pinnate. The species thrive best in a compost of loam, with a little peat and sand. They are admirably adapted for growing in subtropical gardens, where some shelter from winds will be needed, and also for decorating apartments. For general culture, *see* **Phœnix.**

O. granatensis (New Grenadan). *l.* pinnate, with long, narrow segments, which are more or less drooping. Stem smooth. Columbia, 1879. An elegant species, admirably adapted, when in a young state, for table decoration.

O. oleracea. Cabbage Palm. *l.* pinnate, 4ft. to 6ft. long, gracefully arched; segments 1ft. to 2ft. long, bright dark green. Stem slender, swollen at the base, freckled with blackish-brown. *h.* 100ft. West Indies, 1844.

O. regia (royal).* *l.* pinnate, 3ft. to 6ft. long, the segments 6in. to 12in. in length, and nearly 1in. broad, bright green. Cuba, 1836. A very graceful, slender-growing species.

FIG 770. OREODOXA SANCONA.

O. Sancona (Sancona). An easily cultivated and handsome species, with the leafstalks a reddish-bronze when young. It is used, on the Continent, like Cocos and Chamædoreas, for the decoration of apartments. Tropical America. See Fig. 770.

O. ventricosa (ventricose). A synonym of *Gaussia Ghiesbreghtii.*

OREOPANAX (from *oreos*, a mountain, and *Panax*; alluding to the relationship of the plants to *Panax*, and their natural habitats). ORD. *Araliaceæ*. A genus of glabrous or tomentose, stove shrubs or trees, allied to *Hedera*. Sixty-four species have been enumerated, but this number may be reduced; they are natives of tropical America, mostly in the region of the Andes. Flowers capitate, racemose, or paniculate, sessile, each provided with two or three bracts; stamens equal in number to the valvate petals; ovary three to five (rarely six or seven) celled, surrounded by as many styles. Leaves entire, palmately lobed or digitately compound; lobes or leaflets entire or argutely toothed. All the species thrive in good loam, and require abundance of water during the summer months. During the dull winter season, when the plants are at rest, but little water will be needed. Propagated by cuttings of the young shoots. The species here described are probably the only ones yet introduced.

FIG. 771. FLOWERING BRANCH AND DETACHED FLOWER-HEAD OF OREOPANAX ANDREANUM.

O. Andreanum (André's). *fl.* in globular heads, arranged in a terminal, erect raceme. *l.* petiolate, elliptic, entire, or roundish or sub-cordiform and sub-trilobed, or palmate with pinnatifid lobes, covered beneath, as well as the petioles and branches, with a reddish, deciduous tomentum. Trunk simple or slightly branched. Andes of Ecuador, 1883. A very ornamental shrub. See Fig. 771.

O. dactylifolium (finger-leaved). *l.* palmate, usually seven-lobed; lobes deeply divided, and measuring from 6in. to 18in. in diameter; under side clothed with rusty tomentum, upper smooth and deep green. Mexico. An elegant, erect-growing shrub.

O. Epremesnilianum (Count Eprémesnil's). *l.* large, digitate, long-petioled; leaflets seven to nine, the two outer ones oblong, entire, and narrowed at both ends, and the middle ones pinnatifid. 1883. This is probably only a variety of *O. dactylifolium*. See Fig. 772.

O. peltatum (peltate). *fl.* greenish-white, in globose heads, disposed in terminal panicles. *l.* long-stalked, coriaceous, five to seven-nerved, round-cordate or peltate-suborbicular, palmately three to five-lobed; lobes ovate-lanceolate, acuminate, remotely and repandly toothed. Mexico. See Fig. 773. (R. G. 1862, 363.)

Oreopanax—*continued.*

FIG. 772. TIP OF FLOWERING BRANCH AND LEAF OF OREOPANAX EPREMESNILIANUM.

O. platanifolium (Plane-leaved). *fl.*, petals white, tomentose externally; heads sub-globose; raceme paniculate. *l.* petiolate, coriaceous, glabrous and shining above, fuscescent-tomentose beneath, truncate and seven-nerved at base, seven-fid at apex; divisions oblong, acuminate, entire. Stem arboreous. Andes of Peru. SYNS. *Aralia platanifolia*, *Hedera platanifolium*.

FIG. 773. OREOPANAX PELTATUM, showing Habit and detached Portion of Inflorescence.

O. Thibautii (Thibaut's). *fl.* greenish, borne in numerous, globular, stalked heads, arranged on the side of an elongated axis. November. *l.* alternate, stalked, digitate; segments shortly stalked, lanceolate, glabrous. Mexico, 1862. Small tree. SYN. *Aralia Thibautii*. (B. M. 6340.)

O. xalapense (Jalapa). *fl.* greenish; petals glabrous; heads sub-globose; racemes paniculate. April. *l.* long-stalked, digitate; leaflets five to seven, glabrous, shining above, dotted beneath, lanceolate-oblong, acute, narrowed at base, entire, sub-coriaceous. *h.* 6ft. Mexico, 1828. Shrub. SYNS. *Aralia xalapensis* and *Hedera xalapensis*.

ORGYIA ANTIQUA, or VAPOURER MOTH. This is one of the most widespread of injurious insects, and is common even within the limits of London. Its larvæ are at times very hurtful to deciduous trees and shrubs of many kinds. The male moth is shown of the natural size in Fig. 774.

Orgyia antiqua, or Vapourer Moth—*continued.*

The body is dark brown; the wings are rusty-brown, with markings of deeper and paler tints, and at the rear angle of each fore wing is a conspicuous white spot.

FIG. 774. ORGYIA ANTIQUA (Male).

The female has the wings reduced to tiny scale-like organs on each side of the heavy, clumsy body, which is covered with woolly, yellowish-grey pubescence. The

FIG. 775. LARVA OF ORGYIA ANTIQUA.

larva is shown of the natural size in Fig. 775. It is covered with yellowish hairs. On the back of the fourth to seventh segments are long tufts of yellow or brown hairs; and on the back of the last segment, and on each side of the head, is a long black tuft of clubbed hairs. The larva may reach 2in. in length. When full fed, it spins, in crevices or among leaves, a slight greyish-brown cocoon of silk, largely mixed with its own hairs, and in this changes into a hairy pupa. The female emerges in autumn, and lays her eggs on her cocoon, where they pass the winter, the larvæ emerging in spring.

Remedy. The best remedy is hand-picking the insects in all stages of development; the larvæ especially are conspicuous.

ORIGANUM (the ancient Greek name, used by Hippocrates). Marjoram. Including *Majorana.* ORD. *Labiatæ.* A genus comprising about twenty-five species of mostly hardy sub-shrubs or herbaceous perennials, for the most part natives of the Mediterranean region, one being indigenous to the Canary Islands, and two or three broadly dispersed over Europe and extra-tropical Asia. Corolla tube included or exserted; limb bilabiate; whorls two, rarely six to ten, flowered, crowded in globose, oblong

Origanum *—continued.*

or cylindrical spikelets, which are solitary or aggregate at the tips of the branches. Leaves small, entire or slightly toothed; floral ones all reduced to bracts. Few of the species have any ornamental value, but the undermentioned are worth growing. For cultivation of *O. Majorana, see* **Marjoram.** All the other species here mentioned are easily raised from seeds, or from cuttings of the young, growing, barren shoots; or by division of the roots. They like a rather dry, warm, well-drained border, and succeed in almost any soil.

O. Dictamnus (Dittany). Dittany of Crete. *fl.* pink, in drooping heads. Summer. *l.* broad-ovate, obtuse, quite entire, rounded at the base, thick, clothed with dense wool on both surfaces. Branches ascending. *h.* 1ft. Crete, 1551. A very pretty, but rather tender little sub-shrub. (B. M. 298.)

O. Majorana. Garden, Knotted, or Sweet Marjoram. *fl.* purplish or white; spikelets oblong, sessile, glomerate on the branchlets. June. *l.* petiolate, oblong-ovate, obtuse, quite entire, tomentose on both surfaces. Branches nearly glabrous, racemosely panicled. *h.* 1ft. to 2ft. North Africa, 1573. SYNS. *O. majoranoides* and *Majorana hortensis. See also* **Marjoram.**

O. majoranoides (Marjoram-like). A synonym of *O. Majorana.*

O. Maru (mastic), of Sims. A synonym of *O. microphyllum.*

O. microphyllum (small-leaved). *fl.* pink; spikelets few, globose, disposed in small, loose corymbs at the tips of the branches. June. *l.* small, remote, petiolate, broadly ovate, obtuse, round at base. Branches purplish, smooth, filiform. *h.* 1ft. Crete, &c. Sub-shrub. (B. M. 2605, and S. F. G. 573, under name of *O. Maru.*)

O. Onites (Onites). Pot Marjoram. *fl.* whitish; spikelets small, ovoid, numerous, densely corymbose. Summer. *l.* sessile, ovate, serrated a little, rather villous or tomentose. Stems erect, nearly simple, hairy. *h.* 1ft. Mediterranean region, 1759. Sub-shrub. (S. F. G. 572.)

O. sipyleum (Mount Sipylos). *fl.* pink; spikelets oblong, solitary, or by threes, drooping. Summer. *l.* on short pedicels, quite entire; lower ones roundish, hispid or woolly; upper ones ovate, glaucous. Stem decumbent, paniculately branched at top. *h.* 1ft. to 1½ft. Levant, 1699. A very pretty procumbent sub-shrub. (S. F. G. 570.)

O. Tournefortii (Tournefort's). Dittany of Amorgos. *fl.* pink; spikes more dense than in *O. Dictamnus.* August. *l.* sessile, orbiculate, sub-cordate at base. *h.* 1ft. Amorgos, 1788. Sub-shrub. (A. B. R. 537; S. F. G. 569.)

O. vulgare (common). Common or Wild Marjoram. *fl.* purple; spikelets oblong or cylindrical, glomerate, corymbosely panicled. Summer. *l.* petiolate, ovate, obtuse, serrated a little, rounded at the base. Stem erect, villous, herbaceous. *h.* 1ft. to 2ft. Europe, &c. (Britain). (B. M. Pl. 204.)

ORITHALIA. Included under *Agalmyla.*

ORITHYIA. Included under **Tulipa** (which *see*).

ORMOCARPUM (from *ormos*, a chain, and *karpos*, a fruit; referring to the narrow, chain-like pods). SYNS. *Diphaca* and *Rathkea.* ORD. *Leguminosæ.* A small genus (about half-a-dozen species) of tall, often glutinous, stove or greenhouse shrubs, of which one is broadly dispersed between the tropics in Asia and Africa, two or three are indigenous to tropical Africa, and two are Mexican. Flowers yellow, white, or purple-striped, in short, axillary racemes; standard orbicular, unguiculate. Pods linear, compressed. Leaves sometimes impari-pinnate, with small exstipellate leaflets, sometimes one-foliolate, with a large, acute leaflet; stipules striped. The undermentioned, the only species in cultivation, is a greenhouse evergreen, of strong habit. Young specimens only are adapted to pot culture; the older ones should be placed out in the borders in summer. A compost of peat and loam is the best soil for this plant. Propagation may be effected, in April, by cuttings of half-ripened shoots, inserted in the compost above mentioned.

O. coronilloides (Coronilla-like). *fl.* pale yellow; peduncles many-flowered, axillary. May. *l.* impari-pinnate; leaflets ovate, glabrous, small, sub-sessile, opposite or alternate. Stem arboreous; branches spreading. Tropical Africa.

ORMOSIA (from *hormos*, a necklace; referring to the seeds of *O. coccinea*, which are scarlet, with a dark spot, and are strung for necklaces). Necklace-tree. Including *Macrotropis.* ORD. *Leguminosæ.* A genus comprising about eighteen species of stove, evergreen

Ormosia—*continued.*

trees, natives of tropical Asia and America. Flowers white, lilac, or dark purple, panicled or racemose; standard roundish. Pods oblong, or rarely elongated. Leaves impari- or somewhat abruptly pinnate; leaflets coriaceous, rarely stipellate; stipules small or inconspicuous. Ormosias are most readily raised from imported seeds, or they may be propagated by cuttings of the half-ripened young shoots, inserted in sandy soil, under a bell glass, in bottom heat. The species thrive in a well-drained mixture of turfy loam and leaf mould.

O. coccinea (scarlet). *fl.* blue. June. Pods glabrous, shining; seeds scarlet, with a black spot at one end, resembling beads. *l.*, leaflets somewhat ovate, thick, with revolute margins. *h.* 10ft. to 20ft. Guiana, 1823.

O. dasycarpa (thick-fruited). *fl.* blue, large. June. Pods tomentose. *l.*, leaflets acuminated, glabrous on both sides. *h.* 10ft. to 20ft. West Indies, 1793.

ORNAMENTAL GRASSES. *See* **Grasses, Ornamental.**

ORNITHARIUM. Included under **Sarcochilus** (which *see*).

ORNITHIDIUM (from *ornis, ornithos*, a bird, and *eidos*, like; the upper lip of the stigma is beak-like). ORD. *Orchideæ*. A genus comprising about a score species of stove epiphytal orchids, natives of tropical America, from Brazil to the West Indies. Flowers mediocre, or rather small; sepals sub-equal, free, spreading; petals similar to the sepals, or somewhat smaller; lip affixed to the foot of the column, unguiculate at base; peduncles one-flowered, fasciculate in the axils. Leaves oblong or elongated, thinly coriaceous. Stems, in some species ascending, and in others root-like and branching, sheathed with imbricated scales, and bearing one-leaved pseudo-bulbs. The species described below (probably the only ones yet introduced) thrive in a warm, moist house, and do best in pots of peat fibre, sphagnum, and pieces of charcoal. During summer, they like a plentiful supply of water.

O. coccineum (scarlet). *fl.* crimson, long-pedicellate, fascicled, nodding; sepals and petals spreading, ovate-lanceolate, pointed; lip undivided, ovate-oblong, bluntish, contracted above the base. June. *l.* approximate, linear-lanceolate, blunt, emarginate, 6in. to 12in. long. Pseudo-bulbs oval or roundish, compressed. Stem low, scaly below. Jamaica, &c., 1790. (B. M. 1437, under name of *Cymbidium coccineum*; H. E. F. 38.)

O. densum (dense). *fl.* white, purplish, in very dense, aggregated, axillary racemes; sepals linear-lanceolate, acuminate, carinate; petals rather smaller; lip oblong, undivided, channelled and recurved at apex. *l.* oblong-lanceolate, obtuse, emarginate. Pseudo-bulbs oblong, compressed, axillary, one-leaved. Mexico, 1836. (B. R. 1804, and Ref. B. 105, under name of *Maxillaria densa*.)

O. strumatum (tumoured). *fl.* white, small, solitary; the upper sepal acute. *l.* linear-ligulate. Pseudo-bulbs densely aggregated, one-leaved. Costa Rica, 1875. (R. X. O. iii. 207.)

ORNITHOCEPHALUS (from *ornis, ornithos*, a bird, and *kephale*, a head; in reference to the form of the column and anther). ORD. *Orchideæ*. A genus comprising about a score species of stove epiphytal orchids, only one of which is probably in cultivation, natives of tropical America, from Brazil to Mexico. Flowers frequently small, in scattered racemes; sepals almost equal, free, spreading; petals similar; lip continuous with the base of the short column, the lateral lobes thick and rather broad; peduncles axillary, simple. Leaves fleshy or coriaceous, oblong or linear. The genus is remarkable for the very long, slender rostellum, to which the stalk of the pollen-masses is attached by means of its terminal, glandular disk. This long rostellum, on a side view, is very like a bird's bill; hence the name of the genus. These curious little orchids thrive in a warm, moist house, attached to blocks of teak, &c., and suspended near the glass. In

Ornithocephalus—*continued.*

hot, dry weather, they will require frequently plunging into water of the same temperature as the house in which they are growing.

O. grandiflorus (large-flowered). *fl.* yellow; inflorescence many-flowered. *l.* large, oblong, blunt, acute or obtuse. A fine species.

ORNITHOCHILUS (from *ornis, ornithos*, a bird, and *cheilos*, a lip; referring to the shape of the labellum). ORD. *Orchideæ*. This genus comprises only a couple of species of stove epiphytal orchids, natives of Burmah and the Himalayas. Flowers small, pedicellate, disposed in lateral racemes; sepals spreading, the lateral ones rather broader; petals rather narrower than the dorsal sepal; lip spreading at base of column; lamina two or three-lobed. For culture of the undermentioned species, *see* **Aerides** (with which this genus is sometimes confused).

O. fuscus (brownish). *fl.* brownish-yellow, striped with purple, odorous; sepals oblong, obtuse, lateral ones larger, oblique; petals linear, obtuse; lip cucullate, bilobed, unguiculate, the lobes rotundate, fimbriated, with a conical spur. *l.* oblong, fleshy, acute, obliquely bilobed. Nepaul, 1865. This is the proper name of plant described in this work as *Aerides difforme*.

ORNITHOGALUM (the old Greek name used by Dioscorides, from *ornis, ornithos*, a bird, and *gala*, milk; supposed to be so called because the flowers of some species are white as milk, or hens' eggs). Star of Bethlehem. ORD. *Liliaceæ*. An extensive genus (about seventy species) of hardy, half-hardy, or greenhouse bulbous plants, natives of Europe, the Orient, and Africa, one being found in extra-tropical America. Flowers small or mediocre, disposed in elongated or sub-corymbose racemes; perianth six-parted at base, white or yellow, rarely fulvous, never red or rose-purple. Leaves linear, lorate, or subulate, fleshy-herbaceous or somewhat firm. Many of the species are decidedly pretty and interesting border flowers, of the easiest cultivation. The taller, strong-growing, hardy kinds are suitable for naturalising in the wild garden, &c., whilst others are good pot plants for cool conservatory decoration. Propagated by offsets. The species described below are hardy, except where otherwise stated; several of the greenhouse kinds, though, might fairly be called half-hardy.

O. anomalum (anomalous). *fl.* yellowish; raceme somewhat loose, thirty to forty-flowered; scape slender, terete, pale glaucous-green, 1½ft. long. *l.* very frequently solitary, rarely twin, 1½ft. to 2ft. long, ¼in. thick, fleshy-herbaceous. Cape of Good Hope, 1862. Greenhouse. (Ref. B. 178.)

O. arabicum (Arabian).* *fl.* white, with a black centre, having a distinct, aromatic odour, large; raceme six to twelve-flowered, round or deltoid, 3in. to 5in. long and broad; scape 1ft. to 2ft. long. Summer. *l.* 1ft. to 1½ft. long, ¾in. to 1in. broad. Spain to Greece and Egypt, 1629. This very showy and distinct species does not flower so freely in the open air as do most others. (B. M. 728; B. M. 3179 and B. R. 906, under name of *O. corymbosum*.)

O. biflorum (two-flowered). *fl.* greenish-white; raceme loose, six to twenty-flowered, 3in. to 4in. long, 1½in. to 2in. broad; scape 6in. to 12in. long. April. *l.* four to six, fleshy-herbaceous, linear, 6in. to 12in. long, ¼in. to ½in. broad. Peru, 1832. Greenhouse. (S. B. F. G. ser. ii. 246.) There is a variety of this, *chloroleuca*, with few-flowered, loose racemes. (B. R. 1853, under name of *O. chloroleucum*.)

O. capitatum (headed). *fl.* white; raceme dense, twenty to thirty-flowered, capitate, globose, 1in. to 1½in. broad; scape 6in. to 9in. long. June. *l.* fleshy-herbaceous, linear-lorate, about 1ft. long, ½in. broad. Kaffraria, 1862. Greenhouse. (B. M. 5388.)

O. caudatum (tailed). *fl.* white, green; raceme fifty to a hundred (or more) flowered; scape terete, 1½ft. to 3ft. long. May. *l.* five or six, fleshy-herbaceous, lorate-lanceolate, 1½ft. to 2ft. long, 1½in. to 1½in. broad. Cape of Good Hope, 1774. Greenhouse. (B. M. 805; Ref. B. 262.)

O. comosum (hairy). *fl.* greenish-white; racemes twelve to thirty-flowered; scape 3in. to 6in. long. July. *l.* five or six, ascendent, 6in. to 9in. long, about ½in. broad; margins obscurely ciliated. South and East Europe, 1596. (Fl. Ment. 67.)

O. corymbosum (corymbose). A synonym of *O. arabicum*.

O. cuspidatum (pointed). *fl.* greenish-white; perianth segments cuspidate; racemes twelve to twenty-flowered, corymbose, 4in. to 6in. broad; scape 3in. to 5in. long. March. *l.* five or six, linear,

Ornithogalum—*continued.*

10in. to 12in. long, ½in. broad. Asia Minor, 1843. (B. R. xxxi. 21, under name of *O. marginatum.*)

O. fimbriatum (fringed). *fl.* greenish-white; raceme corymbose, eight to twenty-flowered; scape pilose, 1in. to 2in. long. February. *l.* six to eight, densely pilose, 6in. to 8in. long, ½in. broad. Asia Minor, &c., 1820. (B. M. 3077; B. R. 555; L. C. B. vi. 8.)

O. glaucophyllum (glaucous-leaved). *fl.* pure white on the face, green behind, ten to fifteen, corymbose. *l.* five or six, flat, linear, very glaucous, without the central band, 6in. long. Asia Minor, 1875.

O. graminifolium (grass-leaved). *fl.* white; raceme six to thirty-flowered; scape less than 1ft. high. July. *l.* six to eight, linear-filiform, 8in. to 12in. long, ⅛in. broad, dilated at base. Cape of Good Hope, 1794. Half-hardy. (B. M. 972, under name of *O. juncifolium.*)

O. juncifolium (Rush-leaved), of Gawler. A synonym of *O. graminifolium.*

O. lacteum (milk-white). *fl.* white; raceme dense, twenty to fifty (or more) flowered, 6in. or more long, ½in. to 1in. broad; scape erect, 1ft. to 2ft. high. June. *l.* nine or ten, fleshy-herbaceous, ascendent, 3in. to 12in. long, ½in. to 1in. broad. Cape of Good Hope, 1796. Greenhouse. (A. B. R. 274; B. M. 1134; L. B. C. 1159.) Of this species, there is a slender variety, *conicum*, with narrow leaves, bracts, and perianth segments, and a loose raceme. (B. M. 3538, under name of *O. conicum.*)

O. latifolium (broad-leaved). *fl.* white, green at back; raceme fifty to a hundred (or more) flowered, 1ft. to 1½ft. long, 3in. to 4in. broad; scape erect, 1ft. to 2ft. high. June. *l.* five or six, fleshy-herbaceous, lorate, flaccid, 1ft. to 1½ft. long, 1½in. to 2in. broad. Tauria, &c., 1629. (B. M. 876; B. R. 1978.)

O. longebracteatum (long-bracted). *fl.* greenish-white, in a thirty to sixty-flowered raceme; scape 1½ft. to 2ft. long. May. *l.* 1½ft. to 2ft. long, 1in. to 1½in. broad. Cape of Good Hope, 1817. Greenhouse.

O. marginatum (margined). A synonym of *O. cuspidatum.*

O. montanum (mountain). *fl.* greenish-white; raceme six to twenty-flowered, sub-corymbose, 3in. to 4in. long and broad when expanded; scape 2in. to 4in. long. May. *l.* five or six, linear, 5in. to 6in. long, ½in. broad. Italy, 1824. (B. R. 1838, 28; S. B. F. G. ser. ii. 42.)

O. narbonense (Narbonne).* *fl.* milk-white, with a narrow, green stripe on the outside of each segment of the perianth, numerously disposed in a twenty to fifty-flowered raceme, 4in. to 6in. long, 1½in. to 2in. broad; scape erect, 1ft. to 1½ft. high. Spring and early summer. *l.* 1½ft. to 2ft. long, ¼in. to ½in. broad. South Europe, &c., 1810. (B. M. 2510.)

O. niveum (snowy). *fl.* white; raceme somewhat loose, four to ten-flowered, 1in. to 1½in. long; scape very slender, 2in. to 4in. long. May. *l.* five or six, filiform, firm, 3in. to 6in. long, dilated at base. Cape of Good Hope, 1774. Greenhouse. (B. R. 235.)

FIG. 776. RACEME AND UPPER PORTION OF LEAF OF ORNITHOGALUM NUTANS

O. nutans (nodding).* *fl.* white on the upper side, green on the back, forming a loose raceme, drooping, unilateral; scape 8in. to

Ornithogalum—*continued.*

12in. long. April and May. *l.* four to six, lorate, flaccid, 1ft. to 1½ft. long, ½in. broad. South Europe (naturalised in Britain). See Fig. 776. (B. M. 269; F. D. 912; J. F. A. 301; Sy. En. B 1523.) The variety *Boucheanum* is more showy than the type; it is dwarfer, and has larger flowers. (Flora, 1845, i. 131, under name of *O. chlorauthum.*)

FIG. 777. ORNITHOGALUM PYRAMIDALE, showing Habit and detached Single Flower.

O. pyramidale (pyramidal).* *fl.* pure white, marked with a green stripe on the back of each perianth segment, accompanied with coloured bracts, and arranged in a conical cluster, 6in. to 8in. long. Summer. *l.* generally withering before the plant ceases to flower. *h.* 1½ft. to 2ft. Spain, 1752. See Fig. 777.

O. pyrenaicum (Pyrenean). *fl.* pale yellow within, green without; raceme very long; scape upright, 1ft. to 2ft. high, erect. June. *l.* five or six, fleshy-herbaceous, 9in. to 18in. long, ½in. broad. South Europe (naturalised in Britain). (J. F. A. 103; Sy. En. B. 1525.)

O. refractum (refracted). *fl.* greenish-white; raceme five to fifteen-flowered, 2in. to 3in. long and broad; scape 2in. to 4in. long. May. *l.* six to eight, narrow-linear, 6in. to 9in. long, about ⅛in. broad. Hungary, 1820. (S. B. F. G. ser. ii. 58.)

O. revolutum (revolute). *fl.* white; raceme twelve to twenty-flowered, deltoid, 3in. to 4in. long and broad; scape firm, 8in. to 12in. long. May. *l.* four or five, fleshy-herbaceous, lorate, 6in. to 9in. long, ½in. to ¾in. broad. Namaqualand, 1795. Greenhouse. (B. M. 653; B. R. 315.)

O. sororium (sisterly). *fl.* white; raceme sub-corymbose; scape none; perianth 1½in. or more in diameter. *l.* about five, linear-lanceolate-linguiform, glabrous, channelled. Taurus, 1875.

O. thyrsoides (thyrse-like).* *fl.* yellow; raceme dense, twelve to thirty-flowered; scape erect, 6in. to 18in. long. June. *l.* five or six, fleshy-herbaceous, 6in. to 12in. long, 1in. to 2in. broad. Cape

Ornithogalum—*continued.*

of Good Hope, 1757. Greenhouse. See Fig. 778. (B. M. 1164; Ref. B. 20.) There are two or three varieties of this species: in *album*, the flowers are pure white, with a dark centre, and are very numerously produced in fine spikes; in *aureum*, a handsome form (B. M. 190, under name of *O. aureum*), the flowers are of a golden colour; in *flavescens* (B. R. 305), the flowers are saffron-colour; in *flavissimum* (A. B. R. 505), the flowers are of a much deeper yellow than in the type.

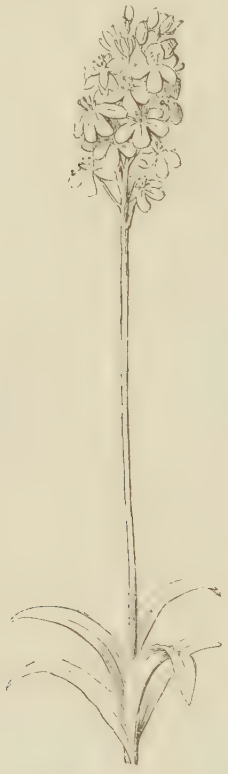


FIG. 778. LEAVES AND INFLORESCENCE OF ORNITHOGALUM THYRSOIDES.

O. umbellatum (umbelled).* Star of Bethlehem. *fl.* of a satiny-white on the inside, and green striped with white without, disposed in an umbel or corymb; scape about 6in. high. May. *l.* six to nine, ascendent, 6in. to 12in. long, ¼in. broad. Europe (naturalised in Britain). One of the showiest and best species. See Fig. 779. (F. D. 1266; J. F. A. 343; Sy. En. B. 1524.)

O. unifolium (one-leaved). *fl.* greenish-white; raceme subspicate, three to six-flowered; scape 3in. to 6in. long. June. *l.* solitary, linear, 3in. to 6in. long, ½in. broad. Gibraltar, 1805. (B. M. 935.) Of this species, there is a taller and more robust variety, *concinnum*, with two, rarely three or five, leaves, and an eight to twenty-flowered raceme. (B. M. 953.)

O. virens (green). *fl.* white; raceme dense, thirty to fifty-flowered; scape 1ft. to 1½ft. high, erect, terete. June. *l.* five or six, fleshy-herbaceous, linear-lorate, 1½ft. to 2ft. long, ⅔in. to 1in. broad. Cape of Good Hope, 1823. Greenhouse. (B. R. 814.)

O. vittatum (striped). *fl.* yellow, green at back; raceme loose, six to twelve-flowered, 3in. to 4in. long, 1½in. broad; scape upright, 6in. to 9in. high. June. *l.* five or six, sub-terete, fleshy-herbaceous, 6in. to 8in. long, ⅛in. broad. Cape of Good Hope, 1802. Greenhouse. (B. M. 1329, under name of *Albuca vittata*.)

ORNITHOGLOSSUM (from *ornis*, *ornithos*, a bird, and *glossa*, a tongue; alluding to the resemblance existing in the petals). SYNS. *Cymation*, *Lichtensteinia*. ORD. *Liliaceæ*. A genus comprising two species (or well-marked varieties) of greenhouse bulbous plants, natives of South Africa. Flowers long-stalked, solitary in the axils of the floral leaves or bracts, in loose, terminal, often few-

Ornithoglossum—*continued.*

flowered racemes; perianth segments distinct, linear or linear-lanceolate. Stem leaves lanceolate or narrow, continuous with the sheath; upper floral ones linear. Stem simple, erect. Ornithoglossums thrive in sandy loam, and require but little care. When growing, they must, of course, be supplied with water; but after flowering, the pots may be stored in a dry, cool place until it is time to repot the following spring. "We find, upon trial, that all the Cape bulbs may be grown with advantage in the open ground, by making up a bed of light, sandy soil, and planting the bulbs from 4in. to 8in. deep, according to their size; they may be planted in April, and, after they have done flowering, may be taken up and kept dry till the following spring, in the same manner as *Tigridia*; or, if left in the ground all the winter, they will require to be covered with some dry litter or old tan, so as to keep the frost from the bulbs" (Sweet).

O. glaucum (glaucous). *fl.* green, edged with purplish-brown, scentless; perianth segments equal, subulate-lanceolate, reflexed, shortly unguiculate; scape leafy, angular. December. *l.* opposite, alternate; radical ones close, largest, channelled, lanceolate, long-acuminate, recurved. Bulb 1¼in. high, ovate-pyramidal. *h.* 6in. 1825. (A. B. R. 233; B. M. 994, under name of *Melanthium viride*.)

O. undulatum (wave-leaved). *fl.* green, with purplish markings, nodding, fragrant at night, but scentless during the day; perianth segments narrow-lanceolate, acute, sessile, reflexed a little above the base; scape short and stout, leafy. September. *l.* radical, distichous, lower ones broadest, lanceolate, tapering to a point; margins brownish-purple, undulated. Root a bulb-tuber, large, solid, and covered with a brown shell. *h.* 6in. 1825. (S. B. F. G. 131.)

ORNITHOPTERIS. *See* **Pteris.**

FIG. 779. ORNITHOGALUM UMBELLATUM.

ORNITHOPUS (from *ornis, ornithos*, a bird, and *pous*, a foot; referring to the claw-like legumes or seed-pods). Bird's Foot. Including *Astrolobium*. ORD. *Leguminosæ*. A genus comprising about seven species of small, low-growing, hardy annuals. Flowers small, pink, white, or yellow, in long peduncled heads or umbels. Leaves impari-pinnate. None of the species are worth growing for horticultural purposes. The genus is represented in the British Flora by *O. ebracteatus* (from Scilly and the Channel Islands), with bright yellow flowers, veined with red, and *O. perpusillus*, a widely-distributed species, with white, red-veined flowers.

ORNITHOXANTHUM. A synonym of *Gagea*.

ORNITROPHE. A synonym of **Schmidelia** (which *see*).

ORNUS. Included under **Fraxinus** (which *see*).

OROBANCHACEÆ. An order of leafless, parasitic herbs, of various colours (never green), for the most part natives of Europe, North Africa, and extra-tropical Asia and North America, a few being found between the tropics in Asia, Africa, or mountainous or extra-tropical South America, and one in Europe and South Australia. Flowers hermaphrodite, regular, solitary in the axils of the bracts, sessile or pedunculate, few, or in dense, terminal, crowded spikes; calyx four or five-toothed or lobed; corolla lobes five, often broad, imbricated; stamens four, didynamous, inserted on the corolla tube. Scales alternate, densely crowded or scattered, upper ones bract-like. Stems or scapes erect, short or elongated, simple or slightly branched. Some of the species are agricultural pests, and do great damage, *e.g.*, *Orobanche pruinosa*, on Beans; *O. cruenta*, on Saintfoin; *O. minor*, on Clover; *O. rubens*, on Lucerne; *Phelipæa ramosa*, on Maize, Tobacco, and Hemp. The order comprises eleven genera (the best known being *Orobanche*) and about 150 species.

OROBANCHE (the old Greek name used by Dioscorides, and said to be derived from *Orobos*, Vetch, and *ancho*, to strangle, because the species were supposed to kill the plants on which they grow). Broom Rape. ORD. *Orobanchaceæ*. A very large genus (above 150 species have been described, but the number of those entitled to specific rank may be reduced to about 100, or less) of various-coloured plants, broadly dispersed over the Northern temperate regions of the Old World, rarely found in the tropics or the Southern hemisphere, and scarcely ever in America; six are natives of Britain. Flowers at the axils of the scales, sessile or sub-sessile, bibracteolate or ebracteolate, densely or interruptedly spicate. Scales often acute. The species have no horticultural value. They are, however, decidedly interesting plants; the annual species may be sown together with the seeds of the host plants they particularly affect. Those of perennial duration should be sown near their special host plants; as, however, three years elapse before the young parasites arrive at the flowering stage, it is better to fence off the places where they are sown, and not disturb the ground.

OROBELLA. Included under **Vicia** (which *see*).

OROBUS (the old Greek name used by Theophrastus; it has nothing to do with the present genus). Bitter Vetch. ORD. *Leguminosæ*. An extensive genus of usually hardy, herbaceous perennials, mostly natives of the Northern hemisphere, and now included (by Bentham and Hooker) as a section of *Lathyrus*, from which it differs in having no tendril at the tip of the petiole. For horticultural purposes, however, the two genera are here kept distinct. Many species are very handsome; they thrive in almost any soil, and are readily increased by dividing the tufted rootstocks in spring. Some force readily, and make

Orobus —*continued.*

charming pot plants for cool-house decoration. The species here described are those generally found in gardens.

O. atropurpureus (dark-purple). A synonym of *Vicia sicula*.

O. aurantius (orange-coloured).* *fl.* deep yellow; peduncles elongated, shorter than the leaves. June. *l.* with five or six pairs of lanceolate, bluntish leaflets. Stems simple, angular. *h.* 1½ft. Caucasus, 1818. (S. B. F. G. ser. ii. 198.)

O. canescens (canescent). A synonym of *O. jilifórmis*.

O. filiformis (thread-formed). *fl.* white, with a tinge of blue; peduncles many-flowered, longer than the leaves. May. *l.* with usually two or three pairs of linear, bluntish, pubescent or dotted leaflets. Stem tetragonal. *h.* 1½ft. South Europe, 1816. SYN. *O. canescens*. (B. M. 3117.)

O. Fischeri (Fischer's). A synonym of *Vicia sicula*.

O. flaccidus (flaccid).* *fl.* purple; vexillum with two prominent obtuse teeth near the middle, which embrace the inner petals; peduncles terminal or axillary. May. *l.* remote, spreading, of two or three pairs of opposite, very long, linear, attenuated, glabrous leaflets, dark green above, paler beneath; stipules large, semi-sagittate. Stem erect. *h.* 6ft. Croatia, &c. (B. M. 2937, under name of *O. stipulaceus*, and wrongly ascribed to North America.)

O. hirsutus (hairy). *fl.* red; racemes axillary, twice as long as the leaves, few-flowered. May. *l.* ovate, acute, with parallel nerves. *h.* 1ft. Thrace, &c., 1822. (B. M. 2345; S. B. F. G. ser. ii. 302.)

O. luteus (yellow). *fl.* yellow; peduncles elongated, many-flowered, about equal in length to the leaves. June. *l.* with three to five pairs of elliptic-lanceolate, mucronulate leaflets, which are glaucous beneath. Stems simple, angular. *h.* 1ft. to 2ft. Europe, 1759. (L. B. C. 783; S. B. F. G. ser. ii. 115.)

O. niger (black). *fl.* purple; peduncles many-flowered, longer than the leaves. June. *l.*, leaflets elliptic, mucronulate, with almost parallel nerves. *h.* 3ft. Europe (Britain). (B. M. 2261; Sy. En. B. 407.)

O. pannonicus (Hungarian).* *fl.* very variable in colour, ranging from white and cream tinged with rose, to purple and white and yellow; peduncles many-flowered, longer than the leaves. May. *l.* with two or three pairs of linear, mucronate leaflets. Stem simple. *h.* 1ft. South Europe, 1794. (J. F. A. 39; S. B. F. G. 22.)

O. p. varius (various-flowered). *fl.* with the standard rose-coloured, and the keel and wings yellowish; peduncles many-flowered, longer than the leaves. May. *l.* with three or four pairs of linear-lanceolate, mucronulate leaflets. Stems simple, angular. *h.* 1½ft. Italy, 1759. (B. M. 675.)

O. sessilifolius (stalkless-leaved). *fl.* purple, in few-flowered racemes. May. *l.*, leaflets narrow, dark green, almost sessile. *h.* 1ft. Greece, &c., 1823. (B. M. 2796; S. F. G. 692.)

O. variegatus (variegated). *fl.* finely variegated, small. Early summer. *l.* with two or three pairs of lanceolate leaflets. Stems simple, flexuous. *h.* 1ft. Europe, 1821. (S. B. F. G. ser. ii. 28.)

O. vernus (spring).* *fl.* purple and blue, with red veins, the keel tinted with green, the whole changing to blue, secund, nodding; peduncles axillary, many-flowered, shorter than the leaves. Spring. *l.* with two or three pairs of ovate-lanceolate, acuminate, shining leaflets. Stems simple, flexuous. *h.* 1ft. Europe, 1629. (B. M. 521; S. F. G. 691.)

ORONTIEÆ. A tribe of *Aroideæ* (*Araceæ*).

ORONTIUM (the old Greek name for a plant said to grow on the banks of the river Orontes). ORD. *Aroideæ* (*Araceæ*). A monotypic genus, the species being a hardy aquatic perennial, with a deep rootstock. This should be planted in open water, from 6in. to 12in. beneath the surface. Propagated by divisions.

O. aquaticum (aquatic). *fl.* perfect, crowded all over the narrow spadix which terminates the elongated scape; lower ones with six concave sepals and six stamens, upper ones with four; spathe incomplete and distant. May. *fr.* a green utricle. *l.* entire, oblong, nerved, long-petioled. North America. (H. E. F. 19; L. B. C. 402.)

OROPHOMA. Included under **Mauritia** (which *see*).

OROTHAMNUS. Included under **Mimetes** (which *see*).

OROXYLUM (from *oros*, a mountain, and *xylon*, wood; referring to the habitat). ORD. *Bignoniaceæ*. A monotypic genus, the species being a glabrous stove tree, which requires almost unlimited root space for its successful cultivation; it does best when planted out in a well-drained, prepared border of turfy loam, leaf mould, and sand, and the long shoots trained near the glass.

Oroxylum —*continued.*

Propagated by imported seeds; or by cuttings, struck in bottom heat.

O. indicum (Indian). *fl.* whitish, striped with purple, large, fœtid, disposed in long, terminal racemes; calyx large, tubular-campanulate; corolla tube broad, obliquely campanulate, and dilated at throat; limb bilabiate. *l.* opposite, large, bi- or tripinnate; leaflets entire, shining. *h.* 40ft. India and the Malayan Archipelago, 1775. SYN. *Calosanthes indica.*

ORPHIUM (named after the mythological personage, Orpheus). ORD. *Gentianeæ.* A monotypic genus, the species being an erect, greenhouse shrub. For culture, *see* **Chironia.**

O. frutescens (shrubby). *fl.* red, showy, in terminal, leafy cymes; calyx loose, tubular; lobes oblong, obtuse, without keels; corolla tube short, sub-rotate. *l.* sessile, linear or oblong, thickish. *h.* 1ft. to 2ft. Cape of Good Hope. (B. M. 37, 707, 818, all under *Chironia.*)

ORRIS-ROOT, or **ORRICE-ROOT.** The root of *Iris florentina.*

ORTGIESIA. Included under **Portea** (which *see*).

ORTGIESIA TILLANDSIOIDES. *See* **Æchmea Ortgiesii.**

ORTHOCERAS (from *orthos*, straight, and *keras*, a horn; referring to the appearance of the outer sepals). ORD. *Orchideæ.* A monotypic genus, the species being a greenhouse, terrestrial orchid, requiring treatment similar to **Disa** (which *see*).

O. Solandri (Solander's). *fl.* in a many-flowered raceme, 6in. long; perianth greenish-yellow, ¼in. long; lateral sepals ¼in. long. *l.* filiform, with long, sheathing bases, rarely linear. *h.* 1ft. to 2ft. Australia and New Zealand. (F. A. O. 1.)

ORTHOCHILUS. A synonym of *Eulophia.*

ORTHOPOGON. A synonym of **Oplismenus** (which *see*).

ORTHOPTERA. *See* **Insects.**

ORTHOS. In Greek compounds, this term signifies straight.

ORTHOSIPHON (from *orthos*, straight, and *siphon*, a curved tube; alluding to the tube of the flower). ORD. *Labiatæ.* A genus comprising about sixteen species of stove or greenhouse perennial herbs, sub-shrubs, or rarely shrubs, mostly natives of the East Indies and the Malayan Archipelago, two or three being found in tropical Africa, and one extending from Malaya into Australia. Flowers pedicellate, slender, or showy; corolla tube exserted; limb bilabiate; stamens four; whorls commonly six, rarely two to four-flowered, in often elongated, distant, or rarely crowded racemes. The undermentioned (probably the only species in cultivation) thrive in a compost of sandy loam and fibry peat. Propagated by cuttings, made of half-ripened shoots.

O. incurvus (incurved). *fl.* pale scarlet; corolla villous, incurved, thrice as long as the calyx; lip spreading; whorls sub-secund. May. *l.* petiolate, ovate or oblong, crenate, pubescent. Stem procumbent at base, ascendent. *h.* 1ft. Eastern India, 1839. Stove evergreen. (B. 173; B. M. 3847.)

O. staminous (long-stamened).* *fl.* pale lilac-blue, nearly 1in. long, very numerous, arranged in whorls, and these again in racemes at the ends of the branches; stamens projecting a long way. July. *l.* ovate or deltoid, coarsely and irregularly toothed, glaucous below. Stem herbaceous, erect. *h.* 2ft. Tropical Asia, &c., 1869. Stove. (B. M. 5833.)

ORTHOSTEMMA. A synonym of **Pentas** (which *see*).

ORTHROSANTHUS (from *orthros*, morning, and *anthos*, a flower; the flowers expand early in the day). ORD. *Irideæ.* A genus comprising seven species of greenhouse herbaceous perennials, natives of the Andes and extra-tropical regions of South America, or of Western Australia. Flowers often two to many to a spathe, very shortly stalked; perianth tube short, sometimes very short; lobes ovate or oblong, spreading; inflorescence

Orthrosanthus—*continued.*

terminal, simple or branched. Leaves linear or narrowly-ensiform, rigid or grass-like, equitant at base of stem; spathes oblong, sessile or pedunculate. Rhizomes woody, very short. The species mentioned below thrive in a cold conservatory, and in such a structure do best planted out. If, however, it is necessary to grow them in pots, use turfy loam and leaf mould, and insure sufficient drainage. Propagated by division of the tufted rootstocks.

O. chimboracensis (Chimborazo). *fl.* blue, in a lax, narrow panicle, which overtops the root leaves; limb funnel-shaped, ½in. deep. *l.* distichous, grass-like, 1ft. or more long, acute. *h.* 1ft. Peru, 1876.

O. multiflorus (many-flowered). *fl.* of a beautiful sky-blue colour; perianth segments ovate-oblong, uniform; stamens much longer than the style. May to July. *l.* linear-ensiform, about equal to the scape; margins glabrous. *h.* 1ft. Australia, 1820. (B. R. 1090, under name of *Sisyrinchium cyaneum.*)

ORVALA (said to be from *Orvale*, the French name for the Clary—*Salvia Horminum*). ORD. *Labiatæ.* A monotypic genus, included, by Bentham and Hooker, under *Lamium.* The species is a hardy herbaceous perennial, of easy culture. It thrives in a common soil, in any sheltered situation. Propagation may be effected either by seeds or by division of the roots in autumn.

O. lamioides (Dead Nettle-like). *fl.* light purplish-red and white; throat of the corolla inflated, the tube almost straight. April. *l.* cordate, unequally or argutely serrated. Stems slightly coloured. *h.* 1½ft. South Europe, 1596. (B. M. 172, under name of *Lamium Orvala.*)

ORYZA (derived from the Arabic name, *Eruz*). Rice. SYN. *Padia.* ORD. *Gramineæ.* A genus of stove, marsh-loving, rather tall grasses, all East Indian. Nearly twenty species have been described; scarcely five, however, are at all distinct, and these may probably be reduced to varieties of *O. sativa.* Spikelets flat-compressed, one-flowered; glumes four, the two outer ones very small, scale or bristle-like; the two upper ones complicate-carinate; panicle terminal, narrow; branches slender, erect, sub-flexuous, often long and slightly branched. Leaves long and flat. *O. sativa*, the well-known rice of commerce, supplies food for a greater number of human beings than are fed on the produce of any other known plant. It is the principal, and often the only, food of the inhabitants of China, India, and the islands of the Malayan Archipelago. The plants have no horticultural value. They are easily grown, and do best when the pots are plunged in tanks in which tropical aquatics are cultivated.

OSAGE ORANGE. *See* **Maclura aurantiaca.**

OSBECKIA (named after Peter Osbeck, 1723-1805, a Swedish clergyman and naturalist, author of "Dagbock Oefer en Ostendyck, resa," 1757). ORD. *Melastomaceæ.* A genus comprising about three dozen species of handsome stove herbs, sub-shrubs, or shrubs, often erect and setose, natives of the East Indies, China, Japan, the Malayan Islands and Australia, one being found in Africa. Flowers pink, violet, or reddish, showy, terminal, solitary, capitate or paniculate; calyx scaly or pilose; petals five, rarely four, obovate, often ciliated. Leaves sub-coriaceous, sessile or petiolate, three to seven-nerved, entire, or rarely serrulated. For culture, *see* **Melastoma.** The species here enumerated are probably the only ones yet introduced.

O. aspera (rough), of Hooker. A synonym of *O. glauca.*

O. chinensis (Chinese). *fl.* cymose, terminal, few; petals purple, acuminated, longer than the stamens. July. *l.* almost sessile, lanceolate-oblong, three-nerved, rather hispid, a little crenulated. *h.* 1ft. to 2ft. China, 1818. Shrub. (B. M. 4026; B. R. 542.)

O. glauca (glaucous).* *fl.* red or purple, on short pedicels, terminal, sub-racemose; calyx with scattered, small, stellate hairs. July. *l.* elliptic, narrowed or obtuse at either end, softly hairy on both surfaces, three to five-nerved. *h.* 2ft. India. Shrub. (B. M. 5085, under name of *O. aspera.*)

O. nepalensis (Nepaul). *fl.* large handsome, in terminal and lateral axillary panicles or corymbs; petals purplish-rose, obovate-

Osbeckia—*continued.*

rounded, spreading. June. *l.* opposite, sessile, lanceolate, often marked with brown spots. Stem 1½ft. high, erect, branched. Nepaul, 1822. Shrub. (H. E. F. 31.)

O. n. albiflora (white-flowered). A pretty white-flowered form. (B. R. 1475.)

O. parvifolia (small-leaved). *fl.* nearly sessile, usually three together; calyx tube and teeth with stalked, stellate, rufous hairs; petals rose-colour, rather large. July and August. *l.* ovate, sub-acute, rather reflexed, three-nerved, nearly sessile, strigose. *h.* 1ft. to 2ft. Ceylon, 1799. Shrub. (B. R. 565, under name of *O. zeylanica.*)

O. rostrata (beaked).* *fl.* rosy-pink, with long, curved, projecting anthers, and disposed in terminal cymes. *l.* oblong-lanceolate, acuminate, bullate, nearly sessile. Stems quadrangular. Bengal, 1831. Shrub. (B. M. 6575.)

O. rubicunda (ruddy). *fl.* deep purple, terminal, on very short stalks, solitary or aggregate; corolla 2in. across; anthers yellow. *l.* oblong, acute. Ceylon, 1865. A very handsome shrub. (B. M. 309.)

O. stellata (starred). *fl.* corymbose; calyx tube elongated; petals four, violaceous; anthers yellow. July and August. *l.* petiolate, ovate-lanceolate, acuminate, five-nerved, beset with stiff hairs on both surfaces. *h.* 2ft. India to China, 1820. Shrub. (B. R. 674.)

O. Wightiana (Dr. Wight's). *fl.* purple, large, fugacious, in close heads. *l.* ovate, small, hairy. Stem hairy. India, 1863. Plant erect, suffruticose.

O. zeylanica (Cingalese), of Lindley. A synonym of *O. parvifolia.*

OSIER. Any of the Willows that are grown for the sake of their long, flexible shoots, which are largely used for basket-making, &c.—and almost any of them may be turned to this account—are called Osiers. Some of the species, however, are much superior to others, and probably the one most extensively grown for the purpose above indicated is *Salix viminalis.* Though this is a moisture-loving plant, it will not succeed in ground charged with stagnant water; and if it is desired to grow it, with a view to profit, the ground should be drained to a depth of 18in. or 2ft. Open drains, about 1ft. in width, will do, but these must always be kept clear. Trench the land 1ft. or so in depth, and insert the cuttings, in rows, 18in. apart, allowing a space of 12in. in the rows. February is, probably, the best time for planting. An acre of land will take about 28,000 cuttings. Cut the shoots—not later than February—as close to the ground as practicable, and keep down weeds by hoeing, &c. If these are allowed headway, the Osier crop will be materially affected.

OSKAMPIA. A synonym of **Nonnea** (which *see*).

OSMANTHUS (from *osme*, perfume, and *anthos*, a flower; in allusion to the fragrance of the flowers). ORD. *Oleaceæ.* A small genus (about seven species) of hardy, or nearly hardy, glabrous shrubs or trees, natives of North America, Eastern Asia, and the Pacific Islands. Flowers small, disposed in short, rarely branched, axillary fascicles or racemes; lobes of corolla four, imbricated. Drupe ovoid or globose. Leaves opposite, evergreen, entire or dentate. For culture, *see* **Olea** (under which the species are sometimes classified).

O. americanus (American). *fl.* in threes, almost sessile; thyrse rather compound, axillary, narrow. June. *fr.* purple, globose, containing an edible nut. *l.* elliptic-lanceolate, about 4in. long, rather coriaceous, shining. Branches rather tetragonal. *h.* 6ft. North America, 1758. Tree.

O. Aquifolium (Holly-leaved).* *fl.* white, very fragrant. Autumn. *l.* oval or oblong, prickly-toothed, coriaceous, smooth, shining,

Osmanthus—*continued.*

somewhat resembling a Holly. Japan. A very handsome, evergreen shrub, varying considerably in the size and toothing of the leaves. (G. C. n. s., vi. 689.) *O. ilicifolius* is a form with smaller leaves, and of more dense, compact habit; of this, there are several variegated forms in cultivation, which may be propagated by cuttings, but are more rapidly increased by grafting on stems of Privet. *O. myrtifolius* is a fixed sport, of dense habit, and with rigid, spineless leaves.

FIG. 780. OSMANTHUS FRAGRANS, showing Habit and detached Tip of Flowering Branch.

O. fragrans (fragrant).* *fl.* yellowish, or almost white; pedicels one-flowered, axillary, and lateral, aggregate from scaly buds. June to August. *l.* elliptic-lanceolate, a little serrated, 2in. long, acuminated, shining above and paler beneath. *h.* 6ft. to 10ft. Japan, China, &c., 1771. A very handsome shrub. See Fig. 780. (B. M. 1552 and L. B. C. 1786, under name of *Olea fragrans.*)

FIG 781. OSMUNDA CINNAMOMEA (see page 530).

OSMODIUM. A synonym of **Onosmodium** (which *see*).

OSMUNDA (from Osmunder, another name of the Scandinavian god Thor). ORD. *Filices*. A small genus (about half-a-dozen species) of handsome, greenhouse or hardy ferns, hardly at all tropical. Sori quite distinct from the leafy part of the frond, forming a panicle made up of copious, thyrsoid clusters. The species in cultivation are generally known as Flowering Ferns, and, with the exception of *O. javanica*, are particularly suitable for the hardy fernery. They thrive best in a compost of turfy loam and peat, to which some river sand may be added. *See also* **Ferns**.

O. cinnamomea (cinnamon).* *sti.* densely tufted, the barren and fertile ones distinct. *barren fronds* simply pinnate, 2ft. to 3ft. long, 6in. to 8in. broad, having stipes from 1ft. to 1½ft. long; pinnæ close, ligulate-lanceolate, 3in. to 4in. long, ¾in. to 1in. broad, cut down nearly to the rachis. *fertile fronds* much smaller; pinnæ lanceolate. Canada to Oregon Mountains, Japan, &c., 1772. Young plants densely clothed with ferruginous tomentum. See Fig. 781 (page 529). Of this handsome species, there is a variety, known as *angustata*, which is smaller in all its parts, and with darker fronds, than the type.

O. Claytoniana (Clayton's).* *sti.* tufted, 1ft. or more long, tomentose when young. *fronds* 1ft. to 2ft. long, 8in. to 12in. broad, the upper, central, or lower pinnæ fertile; barren pinnæ lanceolate, 4in. to 6in. long, 1in. or more broad, cut down nearly to the rachis; fertile pinnæ similar, but shorter; pinnules dense, cylindrical. North America and Himalayas, 1772. A very beautiful species. SYN. *O. interrupta*. See Fig. 782.

O. interrupta (interrupted). A synonym of *O. Claytoniana*.

O. javanica (Java).* *sti.* tufted, 6in. to 12in. long, firm, erect, naked. *fronds* 1ft. to 3ft. long, 8in. to 12in. broad, simply pinnate, the lower or central pinnæ fertile; barren pinnæ 4in. to 8in. long, ⅝in. to ¾in. broad, cuneate at the base, and often slightly stalked, the edge entire or sharply toothed; fertile pinnæ shorter, made up of numerous close, but distinct, oblong, sessile clusters. Kamschatka to Java and Ceylon. Greenhouse. SYNS. *O. Presliana* and *O. Vachellii*.

FIG. 782. OSMUNDA CLAYTONIANA.

O. lancea (lance-like). *fronds*, barren and fertile ones distinct, the former about 1ft. long, oblong, shortly acuminate; pinnæ oblong, acuminate, about 5in. long, stalked, the lowest rather reduced; pinnules narrow-lanceolate, 1½in. long, ¼in. broad, narrowed at both ends, sessile, distinct, slightly toothed upwards. *fertile fronds* ternate-decompound. Japan.

O. Presliana (Presl's). A synonym of *O. javanica*.

Osmunda—*continued*.

FIG. 783. PORTION OF FERTILE FROND OF OSMUNDA REGALIS.

O. regalis (royal).* Royal Fern. *sti.* tufted, 12in. to 18in. long, firm, erect, naked. *fronds* 2ft. to 6ft. long, 1ft. or more broad, bipinnate, the apex fertile; barren pinnæ 6in. to 12in. long, 2in. to 4in. broad; pinnules sessile or slightly stalked, 1in. to 2in. long, ¼in. to ⅜in. broad, oblong, blunt, often unequal at the base, the edge finely serrulate; fertile pinnules cylindrical, forming a copious panicle. Britain. This really noble fern is too well known to require any eulogy. See Fig. 783. The form called *cristata* is very desirable, and differs from the type in having the ends of the fronds and all the pinnæ finely crested. Another, *corymbifera* (see Fig. 784), has, also, curiously forked and crested fronds. *O. palustris* is a slender, small-growing form, in which the young fronds are reddish in colour.

O. Vachellii (Vachell's). A synonym of *O. javanica*.

OSSÆA (named after Don Antonio de la Ossa, once Director of the Botanic Garden at Havannah, Cuba). SYN. *Sagræa*. ORD. *Melastomaceæ*. A rather large genus (about forty species) of stove shrubs or sub-shrubs, confined to tropical America. Flowers usually small, cymose or paniculate; petals four, rarely five. Leaves petiolate, opposite, and ternately whorled, rarely large, entire or slightly toothed. The undermentioned species—probably the only one in cultivation—requires treatment similar to **Melastoma** (which *see*).

O. fascicularis (fascicled). *fl.* white, disposed in many-flowered fascicles; petals taper-pointed. *l.* 4in. to 6in. long, elliptical, tapering at the base, pointed, eminently triplinerved, ciliated and roughish on both sides with scattered, minute hairs. *h.* 6ft. to 10ft. Jamaica.

OSSIFIED. Become like bone—hard, brittle, and close in texture; *e.g.*, a Peach stone.

OSTEOSPERMUM (from *osteon*, a bone, and *sperma*, a seed; referring to the hardness of the seed).

Osteospermum—*continued.*

branches, pedunculate, solitary or loosely paniculate; involucre campanulate or sub-hemispherical; receptacle flat or convex. Leaves alternate, or rarely opposite,

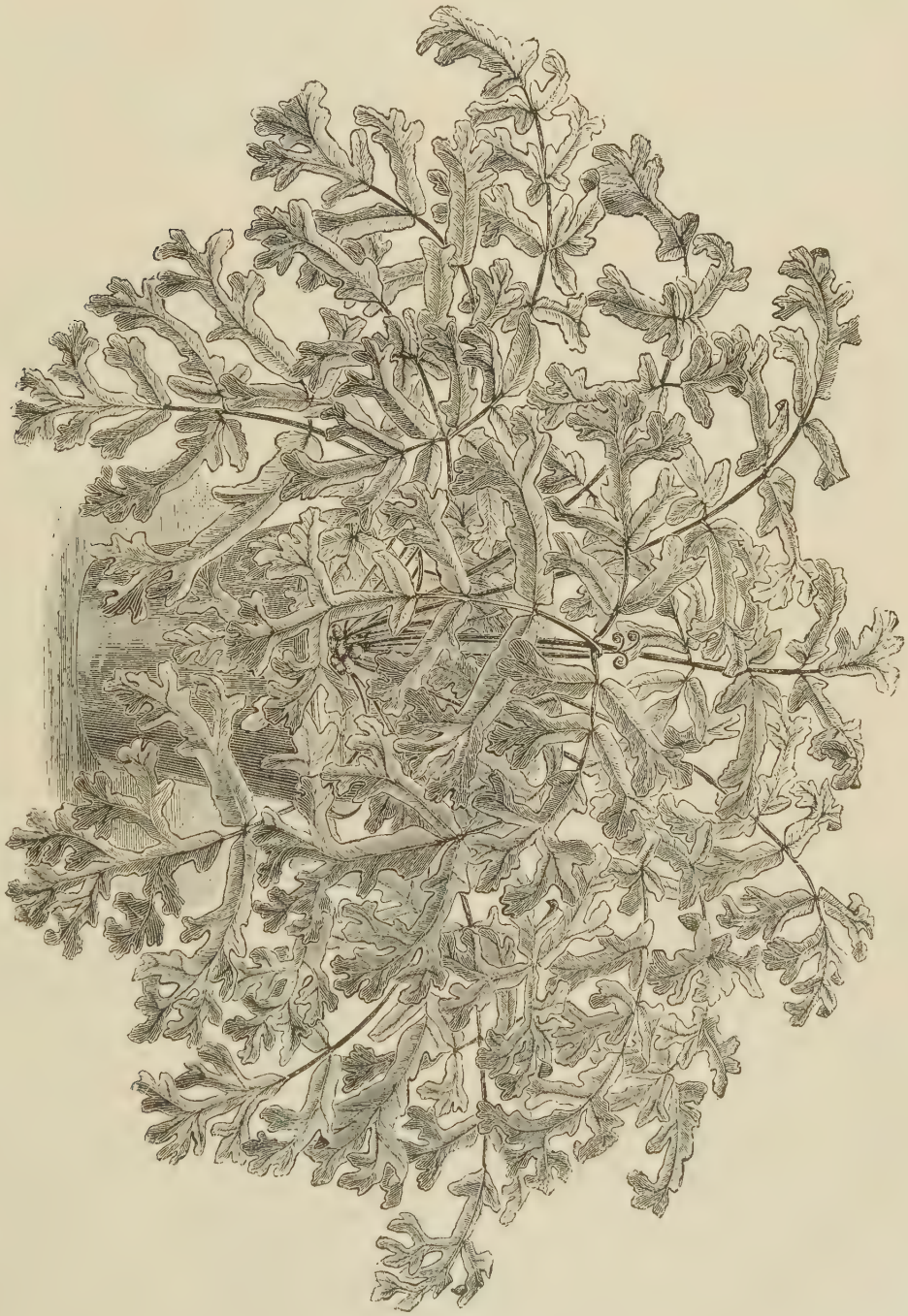


FIG. 734. OSMUNDA REGALIS CORYMBIFERA.

ORD. *Compositæ*. A genus comprising thirty-eight species of greenhouse shrubs, sub-shrubs, or rarely herbs, confined to South Africa. Flower-heads yellow, heterogamous, small or mediocre, at the tips of the entire, toothed, or pinnatifid. The species are probably now lost to cultivation.

OSTRICH FERN. *See* **Onoclea germanica.**

OSTRYA (the old Greek name used by Theophrastus). Hop Hornbeam. ORD. *Corylaceæ*. A small genus (two species) of hardy deciduous trees, closely allied to *Carpinus* in foliage, but having the female flowers in terminal, drooping catkins, each inclosed in an inflated involucre. They are inhabitants of North temperate regions, one being American. Both the species are best grown from imported seeds—for these do not appear to become ripened in this country—or they can be grafted, using the common Hornbeam as a stock. Almost any soil will suit them.

O. carpinifolia (Hornbeam-leaved). Common Hop Hornbeam. *fl.* greenish-white. May. *l.* ovate, acute. *h.* 30ft. to 40ft. South Europe, 1724. SYN. *O. vulgaris* (of Willdenow). (Gn. xii. 372.)

O. virginica (Virginian).* *fl.* greenish-white. May. *fr.* Hop-like, full grown in August. *l.* ovate-oblong, acuminate. *h.* 15ft. to 40ft. Eastern United States, 1692.

O. vulgaris (common), of Willdenow. A synonym of *O. carpinifolia*.

OSWEGO TEA. *See* **Monarda didyma.**

OSYRIS (the old Greek name used by Dioscorides). Poet's Cassia. ORD. *Santalaceæ*. A small genus (five or six species) of greenhouse evergreen glabrous shrubs, natives of South Europe, nearly the whole of Africa, and the East Indies. Flowers small, sub-dicœcious, peduncled; the males in a few-flowered, lateral raceme; the fertile flowers sometimes solitary. Fruit drupaceous, one-seeded, crowned by the limb of the perianth. Leaves narrow or ovate, alternate, entire, papery or rather thick. The undermentioned species, probably the only one introduced, thrives best in a sandy-loam soil. Propagated by cuttings of ripened shoots, inserted under a hand light, in spring.

FIG. 785. FLOWERING BRANCH OF OSYRIS ALBA.

O. alba (white). *fl.* white, pedunculate upon the branchlets. July. *fr.* drupaceous, red, about the size of a pea. *l.* alternate, linear-lanceolate, 1in. long. Stem roundish, striated. *h.* 3ft. to 4ft. Mediterranean region, 1793. See Fig. 785. (S. F. G. 954.)

OTACANTHUS (from *ous, otos*, an ear, and *acanthos*, a thorn; in allusion to the prickly leaves). ORD. *Acanthaceæ*. A small genus (two species) of handsome, erect, branched, pubescent, stove herbs or sub-shrubs, natives of South America. Flowers white or bluish, showy, solitary in the axils, sub-sessile; corolla with a long tube and a bilabiate limb. Leaves entire or toothed. For culture, *see* **Ruellia.**

O. cæruleus (sky-blue). *fl.* bluish purple, flattish, disposed around the shoot, axillary in the few uppermost leaves. *l.* opposite, ovate-acuminate, strongly serrated. Brazil, 1862. (F. d. S. 1526.)

OTAHEITE CHESTNUT. A common name for *Inocarpus edulis*.

OTAHEITE MYRTLE. *See* **Securinega durissima.**

OTANDRA. A synonym of *Geodorum*.

OTANTHUS. A synonym of *Diotis*.

OTHERA (said to be derived from the Japanese name of this shrub). ORD. *Ilicineæ*. A monotypic genus, included, by Bentham and Hooker, as a species of **Ilex** (which *see* for culture).

O. japonica (Japanese). *fl.* white, axillary, aggregate, on peduncles half a line long; corolla white, with four ovate, obtuse petals. *l.* alternate, petiolate, ovate, obtuse, entire, glabrous, coriaceous, spreading, 1½in. long; petioles semi-terete, glabrous. Stem shrubby; branches purple, striated, terete. Japan.

OTHONNA (the old Greek name used by Dioscorides; from *othone*, linen; referring to the soft, downy clothing of the leaves). Ragwort. Including *Doria*. SYN. *Aristotela*. ORD. *Compositæ*. A large genus (about eighty species) of greenhouse or nearly hardy, glabrous shrubs, sub-shrubs, or herbs, confined to South Africa. Flower-heads yellow or rarely bluish, mediocre or small, pedunculate, corymbosely paniculate or solitary at the tips of the branches; involucre campanulate or hemispherical; receptacle flat or convex, naked or foveolate. Leaves alternate or radical, entire, toothed, or dissected, often somewhat fleshy. Othonnas are of the easiest cultivation; they require a thoroughly well-drained, porous soil—provided the drainage is perfect, the nature of the soil is almost immaterial. They are readily propagated by cuttings. The species here described are those best known to cultivation.

O. amplexicaulis (stem-clasping). *fl.-heads* solitary. May and June. *l.* amplexicaul, oblong, entire or denticulate. Stem shrubby. Root tuberous. (B. M. 1312.)

O. carnosa (fleshy-leaved). *fl.-heads* yellow, in a few-headed subcorymbose panicle; pedicels very long. *l.* linear-terete, fleshy, acute, tapering at base. *h.* 9in. 1867. Sub-shrub.

O. cheirifolia (Wallflower-leaved). A synonym of *Othonnopsis cheirifolia*.

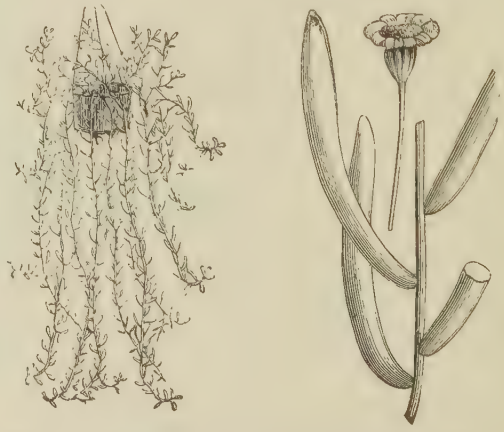


FIG. 786. OTHONNA CRASSIFOLIA, showing Habit, Portion of detached Stem, and Single Flower-head.

Othonna—*continued.*

O. crassifolia (thick-leaved).* *fl.-heads* few, terminal, sub-corymbose; pedicels very long, and slender. A very pretty trailer, and suitable for growing in a basket. See Fig. 786.

O. denticulata (toothed). *fl.-heads* disposed in terminal panicles. April to July. *l.* oblong, denticulated, glabrous, attenuated at base, amplexicaul. *h.* 2ft. 1774. Shrub. (B. M. 1979.)

O. frutescens (shrubby). *fl.-heads* large, in terminal, many-flowered panicles; ray of about eight florets. Late summer. *l.* alternate, obovate, acute, thick, and fleshy. Stem erect, 2ft. to 3ft. high, suffruticose, but succulent. (B. M. 3967.)

O. pectinata (comb-leaved).* *fl.-heads* solitary, twice or thrice as long as the leaves. May and June. *l.* pinnatifid, Wormwood-like, hoary; segments linear, parallel. *h.* 2ft. to 3ft. 1731. An interesting, shrubby plant, readily known by its copious, soft, whitish pubescence. The correct name of this is *Euryops pectinatus*. (B. M. 306.)

O. pinnata (pinnate). *fl.-heads*, ray florets neatly rolled back at night, expanding in the morning. May. *l.* glaucous, obovate, very obtuse, some quite entire, others pinnatifid, with entire, decurrent leaflets. Stem herbaceous. Root tuberous. *h.* 3ft. 1759. (B. M. 768.)

O. triplinerva (three-nerved). *fl.-heads* few or several, loosely corymbose; pedicels very long; involucral scales and rays about five. *l.* crowded towards the apices, obovate, obtuse, tapering at base into a slender petiole. Stem short, sub-simple or forked, shrubby carnose. *h.* 5ft. 1862.

O. tuberosa (tuberous-rooted). *fl.-heads* solitary, rather large, terminal. August. *l.*, radical ones petiolate, broadly ovate or obovate; stem ones few, ovate or oblong. Root tuberous. 1842. Herb. (B. M. 4038.)

OTHONNOPSIS (from *Othonna*, and *opsis*, like; in allusion to the resemblance which exists between the two genera). ORD. *Compositæ*. A genus comprising about eight species of glabrous, greenhouse shrubs, differing from the allied genera, *Othonna* and *Senecio*, in the disk being constantly sterile. One species is North African, another Persian, a third native of Scindia, and the remainder South African. Flower-heads yellow, pedunculate, solitary, or in leafy panicles; receptacle flat or scarcely convex, naked. Leaves alternate, sessile, slightly fleshy, glabrous or slightly toothed. *O. cheirifolia* (probably the only species in cultivation) is a very pretty, low-spreading evergreen, with glaucous leaves. It thrives in almost any soil, but flowers most profusely in light loam, and in a warm situation. A protection of some sort is required in winter. Propagated by divisions, or by cuttings.

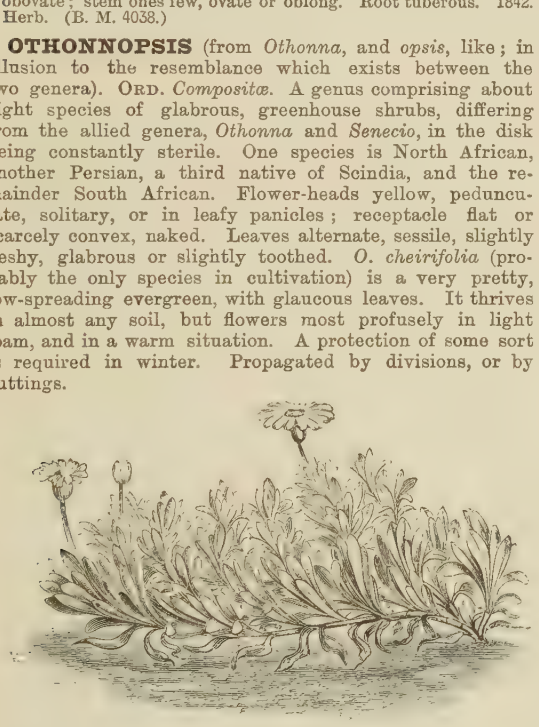


FIG. 787. OTHONNOPSIS CHEIRIFOLIA.

O. cheirifolia (Wallflower-leaved).* *fl.-heads* rich yellow, about 1½in. across, terminal; rays acute. Early summer. *l.* greyish, thick, lanceolate, sessile, narrow at the base, broad and rounded at the apex. *h.* 8in. to 12in. North Africa, 1752. See Fig. 787. (B. R. 266, under name of *Othonna cheirifolia*.)

OTIDIA. Included under **Pelargonium** (which *see*).

OTIORHYNCHUS. A genus of beetles, belonging to the group of Weevils, with short beaks, and long-elbowed, twelve-jointed antennæ, inserted in front of the eyes; well-formed elytra, soldered together, with usually ten rows of small, shallow pits or dots along each, no wings, and simple claws. There are numerous species, mostly about ⅛in. to ½in. long, by half as much broad. One or two do not exceed ¼in. in length.

Otiorhynchus—*continued.*

They are all black or brown in colour, with the legs in some black, in others dull red. They are so much alike that it is very difficult to distinguish some of the species from each other. The following are among the more destructive kinds: *O. picipes* (the Pitchy-legged Weevil), ⅛in. long, pitch-brown, or earth-coloured, with the upper surface tubercled, and sprinkled with minute pale grey or yellow scales. Each pit in the rows on the elytra has a whitish scale, like the pupil of the eye, in the middle. The legs and antennæ are usually rather paler than the body; each thigh is toothed. *O. raucus* is much like the last in size, but may be distinguished by a slight ridge down the middle of the thorax, the dots of the elytra being deeper, and not having white scales, by the black body being clouded with yellow and grey pubescence, and by the red-brown legs and antennæ, and the unarmed thighs. *O. sulcatus* (the Black Vine Weevil) is black or dark brown in colour, with greyish-yellow tufts of hair on the deeply-furrowed elytra. The thorax is coarsely tubercled, and has a slight furrow down the middle; the beak is deeply grooved, and the thighs are toothed. This insect measures about ⅜in. in length. *O. tenebricosus* (the Red-legged Garden Weevil) is said to be one of the most destructive, as well as the largest species of the genus, being about ½in. long. It is at first black, dotted with tufts of delicate yellow down; afterwards glossy. The elytra are only slightly striated; the legs are red-brown or chestnut, and the beak is notched at the tip, and faintly ridged. *O. ligustici* is about ⅜in. to ½in. long; it is black, with greyish scales. The thorax and the almost unstriated elytra are finely granulated, and the thighs bear a short tooth. Other species also have been detected injuring plants, but are less common and less hurtful than the above. The species in this genus are destructive both as perfect beetles and as larvæ. The beetles feed on buds or young shoots of Vines, Peaches, Apricots, and other choice fruit-trees, as well as on the young shoots of Raspberries; and Curtis, in "Farm Insects," mentions *O. picipes* as being very destructive to Peas, Turnips, Kale, &c. In consequence of the damage done, the injured parts are destroyed in a short time; and the plants may be killed, or, at least, much crippled, so as to greatly diminish their productiveness. The larvæ are frequently most injurious to the roots of plants of various kinds, such as Raspberries, Strawberries, and other fruit-bearing plants, as well as to roots of a great variety of other plants in gardens; *e.g.*, Primroses, Sedums, Saxifrages, &c., upon the shoots of which the beetles also feed. The larvæ never show themselves above ground; hence, the only sign of their presence is the withering of the plants. They frequently do great harm to potted plants in greenhouses. They become pupæ about 3in. or 4in. below the surface of the soil.

Remedies. As the beetles are wingless, their attacks are usually limited in area, and the damage can be much restricted by suitable means, of which the most successful are those directed against the perfect insects. As all the species have very similar habits, the same methods of destruction apply to all. The beetles conceal themselves by day in holes in walls, or under loose mortar and stones, among dead leaves, in the soil, or in any other convenient retreats, such retreats varying with the nature of the crop attacked by them, and with the habitat. At night, they come out to feed, and, owing to their not possessing wings, they require to creep up the plants to arrive at the young shoots and buds; or else, in the case of Vines, and other plants trained against walls, they may gain access to them by crawling over the walls. Prevention may be secured by the removal of all cover, such as loose mortar on walls, dead leaves, or bark, &c., and stopping up holes in the walls. This should be followed by putting a belt of soft soap, or tar

Otiorhynchus—*continued.*

mixed with oil, round the tree stems, and along the base of the walls against which Vines and other plants liable to injury are trained. Gas-lime on the soil, or soot or lime, would probably be of service, by preventing the passage of the beetles; and these applications, with or without paraffin or carbolic acid solutions, or gas-water, would help to destroy the larvæ in the soil around the roots of plants. Where a Vine border is badly infested, the best course is to remove the soil to a depth of 5in. or 6in. replacing it with new material. Where the beetles are numerous, and destructive to buds and shoots, it is necessary to use means for their capture. They fall very readily off their food-plants when these are shaken, or when a light is brought into their vicinity. Hence, it is advisable to lay cloths or papers, or to invert an open umbrella beneath the plants, which should then be shaken, and the fallen beetles swept together and killed by means of boiling water; or they may be shaken into rough trays tarred inside. When plants turn sickly without evident cause, investigation should be made, and, if larvæ are found, they should be destroyed.

OTOCHILUS (from *ous, otos*, an ear, and *cheilos*, a lip; referring to the small, ear-like appendages at the base of the lip). SYN. *Tetrapeltis.* ORD *Orchideæ.* A genus containing three or four species of stove, epiphytal orchids, natives of the Himalayas and Burmah. Flowers more or less conspicuous than in *Cœlogyne*, loosely racemose; sepals and petals almost equal, free, narrow, spreading; lip sessile at base of column, saccate at base. Pseudo-bulbs proliferous, two-leaved, continuously produced one above the other, each successive one being emitted just below the apex of the old one, and there throwing out a few fibrous roots; rhizome none. The two species mentioned below require an intermediate house, and an abundant supply of moisture when growing. Pot the plants in peat fibre, pieces of charcoal, and sphagnum.

O. fragrans (fragrant). *fl.* white, in erect racemes, 6in. long; sepals linear-lanceolate; petals linear; lateral lobes of lip slightly acute, middle one ovate-lanceolate. June. *l.* shortly petiolate, oblong-lanceolate, 6in. to 8in. long, plicate. Stem ascendent, short, scaly, terete. Nepaul, 1836. SYN. *Tetrapeltis fragrans.*

O. fusca (brownish). *fl.* sweetly scented, disposed in dense, many-flowered, nodding racemes; sepals and petals obtuse; lip golden, tinged with rose; ovary, bracts, column (and rachis) fuscous. August. *l.* linear-lanceolate. Pseudo-bulbs 6in. to 8in. long, 1in. thick. *h.* 9in. Nepaul, 1840. (B. M. 3921.)

OTOSTEMMA. Included under **Hoya** (which *see*).

OTTELIA (said to be derived from *Ottel*, the native name in Malabar). SYN. *Damasonium.* ORD. *Hydrocharideæ.* A genus comprising six or seven species of short-stemmed, stove or greenhouse, aquatic herbs, natives of tropical Asia, Japan, Australia, the Mascarene Islands, tropical and sub-tropical Africa, and Brazil. Flowers hermaphrodite, in a tubular, shortly bifid, solitary spathe, sessile; calyx segments oblong or linear, rigid, membranous; perianth segments much larger, broadly ovate or orbiculate. Leaves clustered, some submerged on short petioles, others long-stalked, floating, ovate-oblong or very broadly cordate. The undermentioned species, the only ones yet introduced, require to be grown in a cistern or pan of water, placed in the stove. Propagation is effected by seeds.

O. indica (Indian). *fl.* white, on radical, naked, one-flowered scapes; perianth segments roundly-obovate, undulately striate, twice as long as the calyx segments. August. *l.* broadly ovate, about 6in. each way, costate-nerved, very brittle. Rootstock and fibres yellow. East Indies, 1800. (B. M. 1201, under name of *Damasonium indicum.*)

O. ovalifolia (oval-leaved).* *fl.*, outer perianth segments green, ⅜in. to 1in. long; inner ones pale yellow, 1½in. to 2in. in diameter; spathe about 1½in. long. Summer. *l.* ovate or oblong, 2in. to 4in. long when perfect, obtuse, rounded at the base, scarcely or not at all cordate. Australia.

OTTER MOTH (*Hepialus Humuli*). This insect, which is, perhaps, more widely known by the names "Ghost Moth" and "Ghost Swift," belongs to a well-characterised group of Moths, included under the genus *Hepialus*, which are popularly known as "Swifts," because of the rapid darting flight of most of the species. Five species are native in Britain, the Ghost Swift being the largest and most conspicuous, because of the white upper surface of the wings of the male, and its peculiar hovering flight in the dusk of evening. The attraction to the frequented spot is probably a female, concealed among the herbage, above which the male swings almost with the sweep of a pendulum. The popular name of "Ghost" is due to the colour, and to the sudden disappearance of the insect when it settles down among the herbage.

The Swifts are readily recognised by their antennæ being slender and very short, not reaching to the back of the thorax; and, in addition, the wings are long and rather narrow, with a space between the front and hind pairs, on each side, just at the roots. They all fly in the evening twilight. The larvæ are long, and rather slender; and in colour are greyish or dull yellow, with a brown head, and a brown, horny plate on the back of the second ring of the body. They feed on the roots of many herbaceous plants, burrowing into those large enough to allow of their entrance. They change, in cocoons spun in the larger, or amongst the smaller, roots, into brown pupæ, with long bodies, strongly ringed, each ring bearing short stiff hairs, by means of which the pupæ push their way to the surface of the soil before the moths emerge from them.

The male Otter Moth, in the usual form, as stated above, has all the upper surface of the wings silvery-white, with brown fringes; but, in the Shetland Islands, varieties occur that show all transitions in colour between the ordinary male and the female. The female reaches about 2½in. or 2⅝in. in spread of wings, while the male averages only about 2in. The front wings of the female are yellow in colour, with irregular spots, and a broken band near the hind margin, brick-red; the hind wings are dull leaden-grey at the base, tawny near the margin. The larvæ of the Otter Moth, and probably of the common Swift also, sometimes eat roots of Hops, and of a few garden plants, but, fortunately, seldom prove very injurious. The only sign of their presence is the withering of the plants without visible cause.

Remedies. The roots should be examined, and the larvæ of every kind in or upon them should be destroyed. Probably, solutions of paraffin, of carbolic acid, or of other insecticides, would be found beneficial, if the plants were watered with them.

OTTILIS. A synonym of *Leea.*

OURISIA (so called in honour of Governor Ouris, of the Falkland Islands, from whom Commerson obtained the plant). SYN. *Dichroma.* ORD. *Scrophularineæ.* A genus comprising about eighteen species of mostly low hardy perennial herbs, rarely woody at the base; six are natives of New Zealand or Tasmania, and the rest inhabit the Andes or Antarctic parts of South America. Flowers often scarlet or pink, whorled, racemed, corymbose, or solitary; scapes bracteate, one or many-flowered. Leaves chiefly radical, petioled, crenate or entire. *O. coccinea* is a very ornamental plant for growing in patches, and requires a moist and sweet soil, well drained. A position where it must endure exposure to hot sunshine is fatal to it. It is a slow surface creeper, and should be planted freely in frequented parts of the garden. Propagated readily, by divisions of the roots, in early spring. Similar culture will answer for the other species. The two species described here are the only ones seen in gardens.

O. coccinea (scarlet).* *fl.* scarlet, with exserted, cream-coloured anthers, drooping, 1½in. long, in panicled clusters. May to

Ourisia—*continued.*

September. *l.* mostly radical, oval or oblong, unevenly but not deeply notched. *h.* 6in. to 12in. Andes of Chili, 1862. See Fig. 788. (B. M. 5335.)

FIG. 788. OURISIA COCCINEA.

O. Pearcei (Pearce's).* *fl.* crimson, streaked with deep blood-red, tubular, two-lipped, several to a scape. *l.* ovate, coarsely crenated, purplish beneath. Chili, 1863. A handsome species. (F. M. 154.)

OUROUPARIA. A synonym of **Uncaria** (which *see*).

OUVIRANDRA (from *Ouvirandrano*, its native name, said to signify Water-yam; the roots are edible). ORD. *Naiadaceæ*. A small genus of stove aquatics, with tuberculate roots, now included, by the authors of the "Genera Plantarum," under *Aponogeton*. The chief interest of these plants lies in the remarkable singularity of the leaves. The water in which the species are grown should not be above 1½ft. deep. A compost of loam and decayed vegetable matter, in equal parts, is most suitable. The temperature of the water should not exceed 75deg. Propagation may be effected by seeds, or by divisions of the root. The plants, when properly grown, generally sow their own seed.

O. Bernieriana (Bernier's). *fl.* pink, the flower-stem divided into four spikes at the apex. August. Stem much inflated about the middle. Madagascar, 1858. This species resembles the better-known *O. fenestralis* in general structure; the leaves, however, are much narrower and longer, and the nerves are much closer. (B. M. 5076.)

O. fenestralis (window-leaved).* Lace-leaf or Lattice-leaf Plant. *fl.* greenish-white, the flower-stem split at the top into two spikes. August. *l.* 6in. to 18in. long, and from 2in. to 4in. broad, oblong in shape, with an obtuse apex, and spreading out nearly horizontally beneath the surface of the water. The leaves themselves are merely a network of vascular tissue, resembling lace or a lattice-window. Madagascar, 1855. A most singular plant. (B. M. 4894.)

OVAL. Having the figure of an ellipse.

OVARY. The part of the pistil that in the flower incloses the ovules, and in the fruit incloses the seeds. Its true nature will be best understood if we examine the flower of a garden Pea, or of any similar plant. In the centre of the flower, hidden from view by the lower petals, and by a tube formed of the united stalks (filaments) of the stamens, lies the pistil, which, in the order *Leguminosæ*, to which the Pea belongs, consists of a single carpel. To expose it to view, the petals and stamens must be removed; it is then seen to have the form shown in Fig. 789. The part next the stalk (*o*) is broader and greener, and, on being slit open, is found to contain two rows of small bodies, which are the ovules: this part is the Ovary. It becomes narrowed

Ovary—*continued.*

rather abruptly into a paler body (*s*), which is called the style, and which bears at its tip, and for a little distance down the hollow side, a part (*st*) called the stigma, suited by its structure to receive the pollen grains, and to permit of their fertilising the ovules through it. By comparing a ripe pea-pod (Fig. 790)

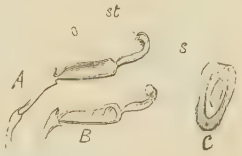


FIG. 789. PISTIL FROM FLOWER OF PEA—A, From the side, natural size, showing (*o*) Ovary, (*s*) Style, and (*st*) Stigma. B, Pistil opened lengthwise, to show a row of Ovules along the Placenta. C, Cross section to show position of Placenta.

with the carpel of the flower, it will be found that the Ovary has increased very much in size, and that the style and stigma have shrivelled to a mere shred (*s*) on the tip of the pod, but no new parts can be distinguished. The ovules have developed into seeds. In such a carpel as a pea-pod, it is not difficult to

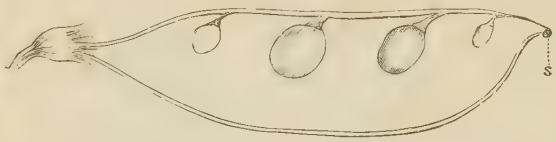


FIG. 790. SMALL PEA-POD, natural size, opened, two Seeds developed, and remains of two unfertilised Ovules; *s*, Remains of Style.

recognise a great likeness to a leaf, folded along the midrib, so that the lower surface is outside, and the upper surface lines the cavity, which is closed by the inturned edges being joined. It is now generally believed that carpels are in reality leaves modified in this way, and that the style is a prolongation of the

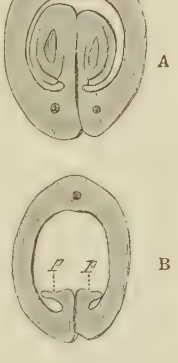


FIG. 791. (A) CROSS SECTION OF OVARY OF ACTÆA SPICATA, with two anatropous Ovules on the Placentæ. (B) CROSS SECTION OF OVARY OF PÆONIA, showing that the Placentæ (*p*, *p*) are the infolded edges of the Carpel.

leaf. Thus, a single chamber is formed, and in it lie all the ovules. The ovules are borne along the two edges of the carpellary leaf, forming a double row, as may be readily seen when a pea-pod is opened. The thickened edges are called the placentæ. The microscopic structure of a pea-pod differs only in details from

Ovary—*continued.*

that of a leaf, and the arrangement of the veins is readily seen to be similar in both. Along the back of the pod (dorsal suture) is a large vein, corresponding to the midrib of the leaf, and along each half of the placenta runs a vein, corresponding to the marginal arched veins in leaves, but strengthened to give a branch to each ovule. The carpel is seen, in the Pea, to be situated nearer the tip of the receptacle than is any other part of the flower. The carpels of *Actæa* (see A, Fig. 791), and of *Pæonia* (see B, Fig. 791), show a very similar cross section to the pea-pod.

The pea-pod may be taken as an excellent example of a carpel in which the Ovary is quite typically formed, and remains so throughout its growth; but this simple structure of the carpel is widely departed from in various ways, and it is necessary to look now at some of the less typical forms to ascertain to what extent they differ from it.

1. In most plants the pistil is made up of two, or more, carpels. These may be, as in *Pæonia* and *Ranunculus*, free from one another down to the base, or they may be united to any extent, from near the base almost, or altogether, to the top of the Ovary, and even the styles and stigmas may be completely united to each other. The Ovaries may be united only by their outer surfaces, each being closed, and remaining

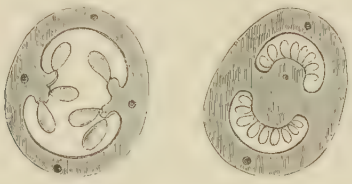


FIG. 792. (A) CROSS SECTION OF OVARY IN FLOWER OF GOOSEBERRY, formed of two Carpels, joined near their edges, the edges themselves being turned inwards to form the Placentæ. (B) CROSS SECTION OF YOUNG OVARY OF POTATO, formed of two Carpels meeting in middle, and completely united into one mass, with axillary Placentæ.

distinct from the rest internally, or they may open into a central space common to all. The ovules may be borne along the edges of the neighbouring Ovaries, either on projecting upright plates, *e.g.*, Poppy, or in rows along the inside of the wall of the Ovary, as in Gooseberry. In all these cases, it is easy to recognise that the compound Ovary is really made up of as many simple Ovaries as there are placentæ, and that the ovules are borne on the edges of the Ovaries. This

FIG. 793. THREE CROSS SECTIONS FROM OVARY OF HYPERICUM HIRSUTUM, to show transition in the three united Carpels, from marginal Placentæ in A to axillary Placentæ in C. A is from upper part, B from near middle, and C from base of Ovary.

will be better understood by a reference to Figs. 792, 793, and 794. In all fresh Ovaries, cross sections prove

Ovary—*continued.*

most instructive for study. In the Primrose and its allies, there occurs what is known as free-central placentation; *i.e.*, the Ovules are borne on a head

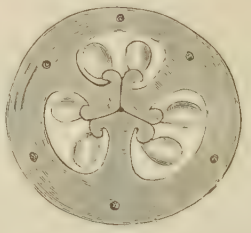


FIG. 794. CROSS SECTION OF OVARY OF FLOWER OF IRIS, showing three Carpels joined at centre into a mass, in which three parts are clearly traceable, each formed of two united Placentæ, each of which bears an Ovule.

(placenta), which looks like a direct growth upwards of the receptacle; and the carpels form only a covering to the head and ovules, which latter do not adhere

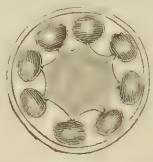


FIG. 795. CROSS SECTION FROM OVARY OF PRIMROSE FLOWER. The Carpels are completely united, and form a ring in the section, quite separate from the free central mass of Placentæ on which the Ovules grow.

to any part of them (see Fig. 795). It is not possible here, in the flower, to tell the number of carpels that unite to form the Ovary, though the number may

FIG. 796. CROSS SECTIONS OF OVARY OF RED CAMPION (LYCHNIS DIURNA)—A, from Flower, showing five Carpels, joined, as in *Iris*, into a central mass bearing the Placentæ, the various Carpels of which are indicated by the dark lines; B, from half-grown Ovary, showing central mass bearing Ovules apparently free, as in the Primrose (remains of broken partitions are seen; otherwise as in A).

be inferred. In *Lychnis* (see Fig. 796), and other *Caryophylleæ*, the structure is almost like that of the Primrose in the mature flower; but it is possible to trace a connection, at a very early stage, between the placentæ and the carpels; and this connection, and the number of carpels, are indicated by lines radiating from the middle of the central mass; and the number of rows of ovules also indicates the number of carpels. The shape of the Ovary, when made up of two or more carpels, usually depends on the number that form it, and is best seen in a cross section of the Ovary made when fresh.

2. Care must be taken not to confound, with truly compound or united Ovaries, a condition sometimes met with—*e.g.*, in *Astragalus* (see Fig. 797), with a simple carpel, and in Flax, with the Ovary composed of several united carpels — in which each carpel is divided, or nearly so, into two cavities, lengthwise, by a partition,

Ovary—*continued.*

which springs from the surface along the midrib of the carpel, enlarging as the seeds ripen.

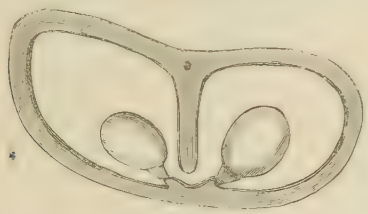


FIG. 797. CROSS SECTION OF NEARLY RIPE POD OF ASTRAGALUS, showing Partition growing from near Midrib towards Placentæ.

3. The typical structure of the Ovary is departed from in some plants, in the growth, after the seeds form, of a number of cross partitions; so that each carpel is made up of a row of divisions, with one seed in each.

4. The typical situation of the Ovary is, as we have seen, at the tip of the flower-stalk (receptacle), or, at least, nearer to it than are the other parts of the flower

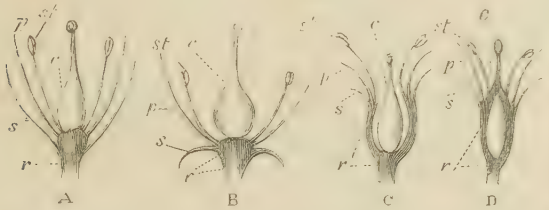


FIG. 798. DIAGRAMS TO ILLUSTRATE MODIFICATIONS OF RECEPTACLE, IN LONGITUDINAL SECTIONS OF FLOWERS. In each the parts shown are—(*r*) Receptacle, (*s*) Sepals, (*p*) Petals, (*st*) Stamens, and (*c*) Carpel, with Ovary, Style, and Stigma. A, Receptacle rounded, with Carpel on tip; B, Receptacle forms a Saucer-like Disk; C, Receptacle forms a Cup around, but not joined to, Ovary; D, Receptacle forms a Cup, united to Ovary, which is sunk in it to near the top. In B, C, and D, the Ovary is at the true tip of the Receptacle, and the Sepals, Petals, and Stamens grow out from the edge of the Disk or Cup.

(see A, Fig. 798). But in many plants the Ovary seems to be more or less completely sunk in the flower-stalk, and to be surrounded by the sepals, petals, and stamens grown together. More careful observation leads to the belief that the receptacle produces, below its apex, a flat ring (see B, Fig. 798) (*e.g.*, in Strawberry), or a cup, which may surround the Ovary (see C, Fig. 798), either (*e.g.*, Cherry) without being united with it, or united to it in part (*e.g.*, Saxifrages), or throughout its whole length (see D, Fig. 798) (*e.g.*, Carrot, *Campanula*, &c.), or even projecting beyond it (*e.g.*, *Fuchsia*),

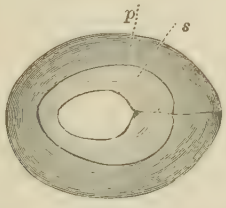


FIG. 799. CROSS SECTION OF HALF-RIPE CHERRY, showing (*p*) Pulpy Flesh and (*s*) Stone. The infolded Edges are clearly seen.

so that it is concealed. Great use has been made of these differences in Systematic Botany, though absolute reliance on them at times tends to separate nearly allied plants.

Ovary—*continued.*

5. Still another mode of departure from the [illegible] type shows itself in many Ovaries, as the seeds ripen in them, due to alterations in the texture of their walls. They may become [illegible] as in the Acorn, and in the Hazel-nut, or they may become pulpy inside, with a thin, leathery, outer skin, as in the Grape; or there may be a thin, tough, or hard outer skin, a more or less abundant pulpy middle layer, and a hard inner shell, known as the "stone" in stone-fruits (see Fig. 799). This change is frequent both in simple and in compound or united Ovaries. Such differences in structure are best understood with reference to the modes of distribution of the seeds.

The ripe fruit is, in most plants, the Ovary merely enlarged, or changed in one or more of the ways indicated; but in some plants the receptacle also enlarges, either into a fleshy head, as in the Strawberry, or the receptacle cup around the Ovary, mentioned above, becomes fleshy, or, in some form or other, becomes a part of the fruit. The methods of opening, to allow of the escape of the seed, differ greatly in those Ovaries from which the seeds escape when ripe; while one-seeded carpels, or such as have fleshy walls in the ripe condition, usually do not split. The consideration of these differences also belong more to the great subject of the distribution of the seeds than to the subject immediately under notice.

FIG. 800. OVATE AND OBTUSE LEAF.

OVATE. The shape of an egg, with the broad end downwards. An Ovate and obtuse leaf is shown at Fig. 800.

OVIEDA (of Linnæus). A synonym of **Clerodendron** (which *see*).

OVIEDA (of Sprengel). A synonym of **Lapeyrousia** (which *see*).

OVILLA. A synonym of *Jasione*.

OVOID. A solid with an ovate figure, or resembling an egg.

OVULE. The name given to that body which develops into the seed, after it has been acted on by the pollen. The Ovules are contained in the **Ovary** (which *see*) in all flowering plants, except the Coniferous trees and shrubs, the Cycads, so commonly grown in hot-houses, and a few other mostly tropical plants that form the natural order *Gnetaceæ*. The ovary in almost all Phanerogams is closed, so as to entirely conceal the Ovules; but in a few (*see* **Mignonette**) it is open at the top from a very early period.

The Ovules are attached to the placentæ (*see* **Ovary**), to which they are fixed by a stalk, or "funiculus." They are usually very small, and are frequently so translucent as to allow the microscopic structure to be seen, either without special preparation, or, after laying them for a little time in some fluid (*e.g.*, weak solution of caustic potash), to render them more transparent. Others require more elaborate treatment, and must be cut open before they are fit to be examined; but to enter into details would occupy too much space. The description here must, therefore, be restricted to one of the more simple forms of Ovules, afterwards pointing out in what respects, chiefly, other forms depart from this type. The Ovule selected for description is one

Ovule—*continued.*

that remains straight from its earliest appearance till its full maturity, such as is found in the Docks and the Buckwheat. The Ovule first appears like a small,

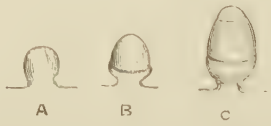


FIG. 801. THREE STAGES IN GROWTH OF ORTHOTROPOUS OVULE. A, Nucellus alone; B, Inner Coat; C, Both Coats growing up to cover Nucellus.

rounded or egg-shaped swelling (see A, Fig. 801), on the placenta, made up of cells alike in form and contents. This body is usually termed the "nucleus" of the Ovule; but the term "nucellus," now coming into use, is preferable, since "nucleus" should be restricted to the body in the protoplasm of living cells generally known under this name. Round the base of the nucellus a cellular ring (see B, Fig. 801), soon begins to appear, and continues to grow up to form a thin covering around that body. But, while this has been growing, another covering (see C, Fig. 801), forms over it also from below upwards, and the two grow till they leave only a minute opening through them at the upper end (*i.e.*, farthest from the placenta), called the "micropyle," which allows the entrance of a slender tube from the pollen grain. The two coverings are named the inner and the outer coats. At the end next the placenta (see

FIG. 802. ORTHOTROPOUS OVULE IN SECTION, showing Two Coats.

Fig. 802), there is, generally, a narrower neck, or there may be a well-formed stalk, or funiculus; though sometimes there is no visible stalk, the Ovule being sessile, or fixed by a broad base. From the woody, or fibro-vascular, bundle in the placenta, a branch runs into the stalk of the Ovule. The part of the Ovule where the coats are grown to the nucellus is the chalaza. At this part, separation takes place when the seed is ripe, and falls from the stalk; and a scar is left, known as the hilum. In the nucellus, a change goes on which results in the formation of a cell—the embryo-sac—very much larger than the others. It lies near the micropyle, from which, in most Ovules, it is separated by one or two layers of cells of the nucellus. It may be almost as long as the nucellus, and may, in course of growth, crush the latter, until all its tissue disappears.

This cell is full of protoplasm; and in the latter may be seen several bodies, as follows (see Fig. 803): At the end next the micropyle are three cells, viz., two rather long ones, known as helper cells; and, at their lower end, a round cell—the embryonal vesicle—from which the embryo is afterwards developed. At the opposite end of the embryo-sac lie three small bodies—the antipodal cells—the use of which is unknown. They are believed to represent a structure that plays an important part in the development of Ferns and their allies, but that

Ovule—*continued.*

has become superseded in the higher plants. In the protoplasm between them lie one or two nuclei, which have to assist in the formation of the endosperm while

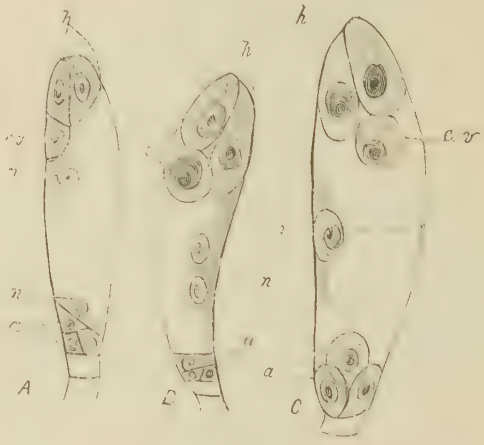


FIG. 803. EMBRYO SAC OF ANGIOSPERM BEFORE FERTILISATION, IN THREE STAGES, showing (*h*) Helper Cells, (*e. v.*) Embryonal Vesicle, (*a*) Antipodal Cells, and (*n*, *n*) Nuclei. In A, the Helper and Antipodal Cells, and the Embryonal Vesicle, are still angular, and the two Nuclei are wide apart; in B, the Embryonal Vesicle is rounded, and the Nuclei lie close together; in C, the Embryonal Vesicle is ready to be fertilised; the two Nuclei are united to form one, and the Antipodal, as well as the Helper Cells, are rounded off.

the embryo, or young plant, is being formed. A brief account of the development of the Ovule into the seed will help to make these various structures more intelligible.

When the stigma is ready to receive the pollen grains, and one of these is placed upon it, the grain very soon, in most plants, pushes a slender pollen tube between the cells of the stigma, down the loose "conducting tissue" of the style, and into the cavity of the ovary, where it finds its way to the micropyle of an Ovule. Passing down this, it pushes the thin coat of the embryo-sac before it, presses between the helper cells, and reaches the embryonal vesicle. It is believed that a part of the protoplasm passes from the tube into one of the helper cells, which then acts in turn upon the vesicle. The helper cells, and, probably, the antipodal cells, disappear; and the embryonal vesicle begins to grow, and to be divided by cell-walls, so that a rounded mass of tissue is formed, attached above to a row of cells, or to a mass in some plants, called the suspensor. The lower rounded mass is the embryo, which increases in size, and shows beginnings of the axis and leaves, or cotyledons. These parts can easily be made out in most plants. In the meanwhile, after fertilisation has been effected, the nuclei in the protoplasm begin to divide, and to form new nuclei, around which cells form, and the embryo-sac becomes filled, more or less completely, with cellular endosperm. This may disappear in the ripening of the seed (*e.g.*, in Beans); or it may remain, and may form a large part of the seed (*e.g.*, in Wheat), in which case it is often called the albumen of the seed.

DEVIATIONS FROM THE ABOVE TYPE OF STRUCTURE AND DEVELOPMENT.

Structure. In many plants (*e.g.*, *Actæa*, *Compositæ*, &c.) there is only one coat on the Ovule (see Fig. 804); in a few (*e.g.*, Mistletoe) there is no coat, the nucellus being exposed in the cavity of the ovary. The funiculus

Ovule—*continued.*

varies much; in some Ovules it is very long (see Fig. 805), while others do not possess it. Most Ovules have it closely adherent to one side, the Ovule being in-

FIG. 804. ANATROPOUS OVULE OF ACTÆA SPICATA IN SECTION. Only one Coat exists on it.

verted, or anatropous, as in *Actæa*, so as to bring the micropyle close to the placenta, while the Ovule itself remains straight (see Fig. 804); other Ovules are curved

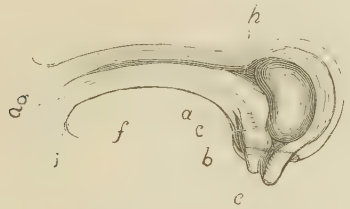


FIG. 805. YOUNG CAMPYLOTROPOUS OVULE OF LYCHNIS DIURNA IN OPTICAL SECTION. The Funiculus is very long, and the Inner Coat projects considerably at the Micropyle.

or campylotropous (see Figs. 805 and 806), as in the Pea and in *Lychnis*; so that in them also the micropyle is brought near the placenta, but the funiculus is only

FIG. 806. CAMPYLOTROPOUS OVULE IN SECTION, showing Two Coats.

adherent slightly to one side of the Ovule. The form selected for description is called erect, or orthotropous (see Fig. 803). The Ovules of orchids have no fibro-vascular bundle in the funiculus.

Development. This shows peculiarities in certain plants. In the Ovules of *Santalum album*, and occasionally in those of some orchids, there are two embryonal vesicles, so that two embryos may form in a seed. In seeds of

Ovule—*continued.*

Oranges, of the Spindle-tree, of Funkias, and of certain other plants, it is usual to find two, or even three or four, embryos. But this results from budding from the tissues of the nucellus of several small cellular growths, which push the wall of the embryo-sac before them, and occupy the place of the true embryo: the latter is usually crushed by them, and perishes. This process has been called Polyembryony. It is a case of vegetative replacing true sexual reproduction, and, by its discovery two or three years ago, various apparent anomalies in hybridisation have been explained.

The processes of fertilisation, and of subsequent development, in the Conifers and other Gymnosperms, are so different in many respects from those above described, as to call for a brief notice. The Ovules are not inclosed in carpels, as in other flowering plants; but in general appearance and structure they do not show any marked peculiarities as contrasted with the Ovules of these plants. They are orthotropous in some (Yew), and anatropous in others (Pines, &c.). They have only one coat. The contents of the embryo-sac, and the development of the embryo, are markedly different from what we find in other Phanerogams. At an early stage, the sac is filled with protoplasm, in which lies a single nucleus; but this very soon divides repeatedly (as in other Phanerogams to form the endosperm), and the sac may thus become more or less full of new cells, the temporary endosperm, ranged along the wall, or occupying most of the cavity. Certain of these cells near the micropyle do not divide like the others, but remain larger than them. Each of these large cells after a time divides into a small cell above and a larger one below. The small cell may remain undivided, but usually divides into a rosette of four (*e.g.*, Juniper), or into more, arranged in two or three layers (*e.g.*, Pines), forming the neck, or rosette cells. In each case, an opening is left between them down to the larger central cell. The whole body formed by the group of cells is known as the corpusculum. The number of corpuscula varies from three to fifteen. The pollen grain lies directly upon the micropyle, with no apparent effect, in most cases, for a long time; but at last it pushes a tube down to the embryo-sac, which is pierced, allowing the end of the tube to lie directly on the rosette cells, and to push between them into the upper end of the large central cell. Some of the substance passes into the latter cell, part becoming diffused, and part remaining visible for a time as an upper nucleus; but this nucleus afterwards becomes united with the true nucleus of the cell, to form a new nucleus. Then follows a series of cell-divisions at the lower end of the central cell, which result, in general, in the formation of four rows of cells, side by side, lengthwise. The lowest cell of each row divides, to form an embryo. Thus, it is the rule for Gymnosperms to produce several embryos in a seed; but in most seeds only one embryo is fully developed, the others being destroyed by pressure of the one upon them. This one developed is nourished largely at the expense of the endosperm.

Much use is made in Systematic Botany of the differences in structure, form, and development of and in Ovules.

The meaning of the lettering in the sections of Ovules is as follows: *a*, outer coat; *b*, inner coat; *c*, nucellus; *d*, embryo sac; *e*, micropyle; *f*, stalk, or funiculus; *g*, fibro-vascular bundle of stalks; *h*, chalaza; *i*, placenta.

OXALIDEÆ. A tribe of *Geraniaceæ*.

OXALIS (from *oxys*, acid; referring to the taste of the leaves). TRIBE *Oxalideæ* of ORD. *Geraniaceæ*. A very large genus (upwards of 220 species) of greenhouse, hardy, or nearly hardy herbs, sometimes stemless, with a bulbous or fleshy rhizome, sometimes

Oxalis—*continued.*

caulescent, rarely suffruticose. Three or four species are found in the temperate regions, one or two are broadly dispersed between the tropics, and the rest are almost equally distributed through South Africa, tropical and sub-tropical America, and extra-tropical South America. Flowers yellow, pink, or white, sometimes dimorphous, regular, on axillary or radical, one or more flowered peduncles; sepals five, imbricate; petals five, contorted. Leaves radical or cauline, exstipulate, alternate; digitately or pinnately tri- to many-foliolate; leaflets entire or emarginately bilobed. Stipules scale-like, adnate to the petioles, or none. All the species are of very easy culture, and thrive best in sandy soil, and in a warm and dry situation. They are interesting and pretty as borders to other plants, or when forming large masses among the latter. They are also suited for points of rockwork, associated with ferns, or when forming masses in nooks or corners in woods, or on the turf. Used as edgings, from 6in. to 12in. apart is sufficiently close for the taller-growing species. The plants root fast, and spread rapidly. Several species are most effective pot-plants, and may either be kept under glass all the year round, or laid on their sides out of doors, when dormant, and thoroughly dried off. Propagated by seeds, by cuttings, and by divisions of the root. The species here described are greenhouse perennials, except where otherwise stated.

O. Acetosella (Acetosella).* Common Wood Sorrel. *fl.* white, beautifully veined with purple; petals oval, blunt; scapes longer than the leaves, one-flowered. Spring. *l.* obcordate, puberulous. Root of many scaly joints, creeping. *h.* 3in. Northern hemisphere (Britain). (Sy. En. B. 310.) Of this perennial species, there is a very interesting but somewhat rare variety, with deep rose-purple flowers.

O. arenaria (sand-loving).* *fl.* bright violet-purple, 1in. to 1¼in. across, disposed in umbels of three to ten. *l.* of three or four sessile, bilobo-obcordate leaflets, glaucous beneath. Rhizome of fleshy scales. *h.* 4in. Chili, 1875. Half-hardy perennial. (B. M. 6193.)

O. articulata (jointed).* *fl.* bright mauve-pink, 1in. in diameter, produced in umbels, on elongated scapes. *l.* trifoliolate, with broadly obcordate leaflets, of a bright green, with reddish margins. Rootstock stout, woody, 2in. to 3in. high. South Brazil, 1870. A very distinct plant. (B. M. 6748.)

O. Barrelieri (Barrelier's).* *fl.*, petals yellow, with two orange spots at the base of each lamina, obcordate-cuneate, united by their claws; peduncles solitary, axillary from the upper leaves. March and April. *l.* spreading; leaflets three, drooping, rhombeo-ovate, glabrous. Stem 8in. to 12in. high. Brazil. Greenhouse annual. (B. M. 3748.)

O. bipunctata (two-spotted-sepaled). *fl.* lilac, with deeper veins; petals truncate, unequally crenate; scape compressed, paniculately many-flowered, and (as well as the petioles) pilose. Spring. *l.*, leaflets three, sessile, broadly obcordate, pubescent beneath, smooth above. *h.* 6in. Brazil, 1826. (B. M. 2781.)

FIG. 807. OXALIS BOWIEI.

O. Bowiei (Bowie's).* *fl.* rose-red, yellowish at the base inside, large; peduncles about equal in length to the leaves, umbelliferous. August. *l.*, leaflets three, obtuse, almost sessile, light green above, slightly pubescent underneath, ciliated. *h.* 6in. to 10in. Cape of Good Hope, 1824. An elegant species. See Fig. 807. (B. i. 25; B. R. 1585.)

O. caprina. Goat's Foot. *fl.* bluish flesh-colour, with a yellow bottom, erect; scape umbelliferous, two or three-flowered. March to June. *l.*, leaflets three, obcordately two-lobed, smooth, somewhat ciliated. Bulb ovate, triangular. *h.* 3in. Cape of Good Hope, 1757.

O. carnosa (fleshy). *fl.* yellow, with obtuse, emarginate, sometimes denticulated petals; scape two, three, or many-flowered. Autumn. *l.*, leaflets nearly sessile, obcordate, fleshy, marked beneath with crystalline dots. Stem short, scaly. Root fusiform. *h.* 3in. to 6in. Chili, 1825. (B. M. 2866; B. R. 1063.)

O. cernua (drooping). *fl.* yellow, at first drooping; scape umbelliferous, many-flowered. Spring. *l.*, leaflets three, obcordately two-lobed, smooth, or a little ciliated. *h.* 6in. Cape of Good Hope, 1757. There is a variety, *flore-pleno*, having double flowers.

FIG. 808. OXALIS CORNICULATA, showing Habit, and (*a*) detached Bud, (*b*) Expanded Flower, and (*c*) Capsule.

O. corniculata (horned).* *fl.* yellow, with emarginate petals; peduncles somewhat umbellate. Spring to autumn. *l.*, leaflets obcordate. Stem decumbent, branched, rooting. Ubiquitous, except in very cold regions (Britain). Annual. See Fig. 808. (S. F. G. 451; Sy. En. B. 311.)

O. c. rubra (red).* A very handsome, hardy, annual or biennial, distinguished from the type in having dark purple leaflets. It is a pretty plant for edging, and for growing in small patches; but it increases so rapidly that it often becomes a weed.

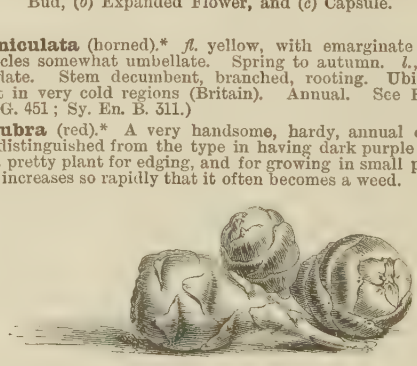


FIG. 809. BULBS OF OXALIS CRENATA.

O. crenata (scolloped-petaled). *fl.* yellow, striped with purple; petals crenated; peduncles umbelliferous, five or six-flowered, longer than the leaves. September. *l.*, leaflets obovate. Stem erect, leafy. *h.* 2ft. Lima, 1829. Greenhouse annual. See Fig. 809. (S. B. F. G. ser. ii. 125.)

O. Deppei (Deppe's). A synonym of *O. tetraphylla.*

O. elegans (elegant).* *fl.* purple, large; sepals acuminated, with two spots at the top of each; scapes very long, two to six-flowered. July. *l.*, leaflets three, broad, roundish-obovate, emarginate, violet on the under surface, and, as well as the petioles, smooth. *h.* 6in. Peru. Plant stemless. (B. M. 4490.)

O. enneaphylla (nine-leaved).* *fl.* white or pale rose-coloured, with purple veins; peduncles the length of the leaves. June. *l.*, leaflets from nine to twenty, usually in two series, smooth, glaucous, obcordate, wedge-shaped, almost bifid. Stipe creeping at base, scaly. *h.* 4in. Fuegia, 1876. Hardy perennial. (B. M. 6256.)

O. floribunda (bundle-flowered). A synonym of *O. rosea.*

Oxalis—*continued.*

O. grandiflora (large-flowered). A synonym of *O. variabilis albiflora.*

O. hirta (hairy).* *fl.* varying from pale violet to deep red; peduncles one-flowered, axillary. *l.* sub-sessile, with narrow-lanceolate or linear leaflets, glabrous above and hairy beneath. *h.* 3in. Cape of Good Hope.

O. h. fulgida (shining). *fl.* of a beautiful purple colour. September to November. Cape of Good Hope, 1820. (B. R. 1073.)

O. h. rosacea (rose-coloured). *fl.* deep red, pale outside, with yellowish claws. Cape of Good Hope, 1793. (B. R. 1031, under name of *O. rubella*).

O. incarnata (flesh-coloured). *fl.* pale flesh-coloured, with very long styles; peduncles the length of the leaves, one-flowered. Spring. *l.* stalked, several at remote distances, in whorls. Stem weak, erect, purple, branched, smooth, leafy. Roots of two or three fusiform legs. *h.* 6in. Cape of Good Hope, 1739.

O. lasiandra (woolly-stamened).* *fl.* crimson, finely pubescent on the outside, large, borne in umbels of about twenty. Summer. *l.* digitate; leaflets 3in. long, 1in. broad, oval-spathulate, wavy at the edges, dark green, paler underneath, and spotted with crimson. *h.* 9in. to 18in. Mexico, 1840. (B. M. 3896.)

O. lasiopetala (hairy-petaled). *fl.*, petals deep rose-colour, oblique; peduncle elongated, terminated by a many-flowered cyme. *l.* radical, numerous, on long, terete petioles; leaflets large, obcordate, with a deep notch. Root tuberous and nodose. Buenos Ayres and Monte Video. (B. M. 3932.)

O. latifolia (broad-leaved). *fl.* violet, a little smaller than those of *O. carnosa*; scapes six or seven-flowered. *l.*, leaflets three, somewhat deltoid, emarginately two-lobed, ciliated. *h.* 6in. Mexico.

O. lobata (lobed).* *fl.* yellow, spotted with red; sepals acute; scapes longer than the leaves. October and November. *l.*, leaflets obcordate, rather glaucous beneath. *h.* 3in. Chili, 1823. Plant smooth, stemless. Hardy. (B. M. 2386.)

O. lupinifolia (Lupine-leaved). *fl.* yellow; scape one-flowered, length of petiole. Autumn. *l.*, leaflets seven or eight, lanceolate, acutish, smooth, spotted at the base. *h.* 3in. Cape of Good Hope, 1775.

O. luteola (yellowish). *fl.* yellow; scapes one-flowered, length of leaves, with two bracts a little above the middle. January to September. *l.*, leaflets obcordate, somewhat retuse. Roots bulbous. *h.* 3in. Cape of Good Hope, 1823. Plant hairy.

O. Martiana (Martius').* *fl.* deep purple-rose colour, disposed in ample cymes on radical scapes; petals cuneate, oblique, a little hairy at back. *l.* radical, on long, flexuous petioles; leaflets large, obcordate, approaching triangular, with a rather deep but sharp sinus. Argentine Republic. (B. M. 3938.)

O. monophylla (one-leaved). *fl.* pale purplish, with a yellowish tube, the filaments bearing glandular hairs; scapes one-flowered. Autumn. *l.* simple, ovate, retuse. *h.* 2in. Cape of Good Hope, 1795. SYN. *O. rostrata.*

O. Neæi glabrata (Nee's glabrous). *fl.* whitish, minute, inconspicuous, disposed in axillary cymes. *l.* trifoliolate; leaflets ovate. Mexico, 1872. (Ref. B. 292.)

O. Ortgiesii (Ortgies'). *fl.* yellow, small, in dichotomous, axillary cymes. *l.* trifoliolate, on long, red stalks; leaflets ovate, triangular, dark olive-green above, purple beneath, with a broad, angular notch cut from the apex. Stems purplish, erect. Roots fibrous. *h.* 1ft. Andes of Peru, 1875. (R. G. 817.)

O. pentaphylla (five-leaved). *fl.* lilac or rosy-flesh-coloured, with yellowish base; peduncles one-flowered, longer than the leaves. Spring to autumn. *l.*, leaflets five, linear, rather entire at the apex. Stem somewhat erect, naked below. *h.* 6in. Cape of Good Hope, 1800. (B. M. 1549.)

O. purpurea (purple). *fl.* purple; scapes one-flowered, longer than the leaves, with two bracts under the middle. Autumn. *l.*, leaflets roundish, wedge-shaped. Roots bulbous. *h.* 3in. Cape of Good Hope, 1812.

O. rosea (rose-coloured).* *fl.* rose, the petals crenated at the apex; peduncles bifid, corymbosely-racemose at the apex, four times longer than the leaves. Spring. *l.*, leaflets three, obcordate. Stem erect, fleshy, leafy. *h.* 6in. to 12in. Chili, 1823. (B. M. 2415 and 2830; B. R. 1123, under name of *O. floribunda.*)

O. rostrata (beaked). A synonym of *O. monophylla.*

O. rubella (ruddy). A synonym of *O. hirta rosacea.*

O. stricta (upright).* *fl.* yellow; peduncles axillary, two to six-flowered, longer than the leaves. April to December. *l.* trifoliolate; leaflets obcordate. Stems branching, leafy. *h.* 1½ft. North America, 1658 (naturalised in Britain). Hardy annual. (Sy. En. B. 312.)

O. tetraphylla (four-leaved).* *fl.* lurid red or purplish-violet, large; umbels many-flowered; scape and petioles loosely pilose. June. *l.*, leaflets large, obcordate, pilose, glaucous beneath, on short petioles. Bulbs large, scaly. Mexico, 1827. A very handsome, hardy perennial, thriving in almost any situation. See Figs. 810 and 811. (L. B. C. 1500; S. B. F. G. ser. ii. 96, under name of *O. Deppei.*)

Oxalis—*continued.*

FIG. 810. OXALIS TETRAPHYLLA, showing Habit and detached Flower.

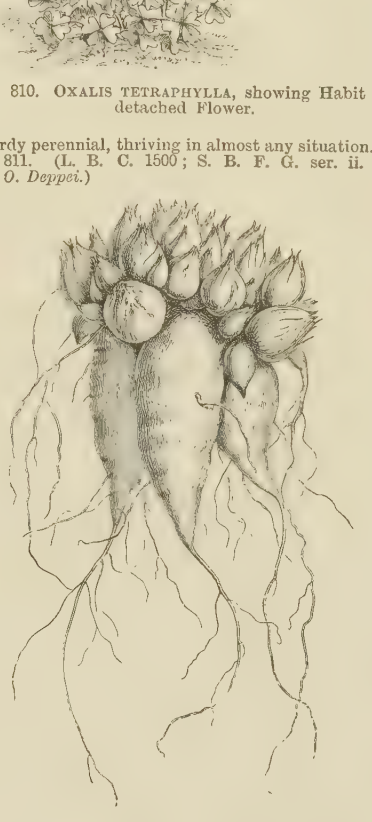


FIG. 811. BULBS OF OXALIS TETRAPHYLLA.

O. tortuosa (twisted). *fl.* umbellate; petals yellow, usually bordered with red. June. *l.*, leaflets linear, obtuse, pilose beneath. Stem fleshy, scaly. *h.* 6in. Chili, 1826. (B. R. 1249.)

O. tuberosa (tuberous). *fl.*, peduncles umbelliferous. *l.*, leaflets ovate. Stem branched. Root tuberculate. *h.* 5ft. Bolivia, 1853. The tuberous roots, when cooked, are used, by the Chilians, as an article of food. (R. G. 1126.)

O. valdiviensis (Valdivian).* *fl.* deep yellow, with a reddish streak, particularly on the outside, disposed in small clusters on the ends of the very long peduncles. Summer. *l.*, leaflets cordate, with very rounded lobes. *h.* 6in. to 8in. Chili, 1862. A charming, hardy annual. (R. G. 626.)

O. variabilis (variable).* *fl.* white or red; pedicels equal to or longer than the leaves. October to December. *l.*, leaflets roundish, the middle one cuneated at the base. *h.* 3in. Cape of Good Hope, 1795. Plant stemless. (B. R. 1505.)

O. v. albiflora (white-flowered). *fl.*, limb of corolla white, large; scapes as long as the petioles. July. (B. M. 1683, under name of *O. grandiflora.*)

O. v. rubra (red). *fl.*, corolla red; scapes longer than the petioles. September to November. (B. M. 1712.)

O. v. speciosa (showy). *fl.* rose-purple; styles very long; scapes one-flowered, about equal in length to the petioles. Autumn. *l.* stalked, with three roundish leaflets. *h.* 3in. 1690.

O. versicolor (various-coloured).* *fl.* white inside and reddish outside; styles very long, and as well as the filaments beset,

Oxalis—*continued.*

with glandular hairs. Early spring. *l.*, leaflets three, linear, emarginate, with two red glands beneath. Stem declinate, naked at the base. *h.* 3in. Cape of Good Hope, 1774. (B. M. 155.)

O. violacea (violet-coloured). *fl.* pink, erectish, with a short involucre; scape umbelliferous, three to nine-flowered. Spring to autumn. *l.*, leaflets three, obcordate, smooth, reddish underneath. Bulbs fusiform, black. *h.* 3in. North America, 1772. Hardy perennial. (B. M. 2215.)

OXEYE. *See* **Buphthalmum.**

OXEYE DAISY. *See* **Chrysanthemum Leucanthemum.**

OXLIP. *See* **Primula elatior.**

OXYANTHUS (from *oxys*, sharp, and *anthos*, a flower; referring to the sharply-toothed calyx and corolla). Syn. *Megacarpha.* Ord. *Rubiaceæ.* A genus comprising about a dozen species of highly ornamental stove trees and shrubs, with terete branches, inhabiting tropical, sub-tropical, and South-eastern Africa. Flowers white or yellow, scented, elongated, disposed in short or long, many-flowered, axillary corymbs; calyx five-toothed; corolla hypocrateri-formed, five-lobed; pedicels bracteolate. Leaves opposite, shortly petiolate, often oblique at base, coriaceous; stipules rather large, intra-petiolar, oblong, obtuse or acute, deciduous. The two species described below thrive in a peaty soil, and should be grown in well-drained pots, in a light, airy position. Practically, the conditions which are found to suit their near allies, the Gardenias, will also suit these. Propagated by cuttings, inserted under a bell glass, in bottom heat.

O. speciosus (showy). A synonym of *O. tubiflorus.*

O. tubiflorus (tube-flowered).* *fl.* white, 6in. long, with the limb 2in. across, in terminal heads. July. *l.* broad, 5in. long. Branchlets, leaves, and calyces glabrous. *h.* 3ft. to 4ft. Sierra Leone, 1789. Shrub. Syns. *O. speciosus* (B. M. 1992), *Gardenia tubiflora* (A. B. R. 183). (B. M. 4636.)

O. versicolor (various-coloured). *fl.* whitish, rose-colour, and pink; corolla tube 4in. to 6in. long; segments linear, scarcely longer than the stamens. July. *l.* oval-lanceolate, acuminate, glabrous. *h.* 3ft. 1839. (F. d. S. ii. 148.) Stated to come from Cuba in work just quoted; it, however, must be a native of tropical Africa.

OXYBAPHUS (from *oxybaphon*, a vinegar saucer, or small shallow vessel; in allusion to the shape of the involucre). Umbrella Wort. Syns. *Calymenia, Calyxhymenia, Vilmania.* Ord. *Nyctagineæ.* A genus comprising about a score species of greenhouse or hardy, annual or perennial, erect or prostrate herbs, mostly natives of Western America, a few being indigenous to the Eastern States of North America, and one Himalayan. Flowers white, pink, or scarlet; involucre one to five-flowered; perianth campanulate or funnel-shaped. Fruit small. Leaves opposite, sessile or petiolate. The species are of no great value for horticultural purposes. Those described below thrive in a sandy-loam soil. Propagated by seeds, sown in the open border in May, or on a mild hotbed in March; or by divisions in spring.

O. Cervantesii (Cervantes'). *fl.* bright pink, panicled; peduncles and involucres villously viscous. Summer and autumn. *l.* opposite, long-stalked, cordate, obtuse, entire, slightly pubescent; margins ciliated with short hairs. *h.* 1½ft. Mexico, 1823. Half-hardy perennial. (S. B. F. G. 84.)

O. viscosus (clammy). *fl.* pink, racemose. June to October. *l.* cordate-orbiculate, acute, tomentose. *h.* 2ft. Peru, 1793. Hardy annual. When the seeds are ripe, the calyx turns brown, expands, and is suspended over them like a little umbrella. (B. M. 434.)

OXYCARPUS. A synonym of **Garcinia** (which *see*).

OXYCEROS. A synonym of **Randia** (which *see*).

OXYCLADIUM. Included under **Mirbelia** (which *see*).

OXYCOCCUS (from *oxys*, sharp, and *kokkos*, a berry; referring to the sharp, acid taste of the berries). Cranberry. Syn. *Schollera.* Ord. *Vacciniaceæ.* A genus

Oxycoccus—*continued.*

comprising only a couple of species of small, hardy decumbent or sub-erect, very glabrous shrubs, natives of Europe, North Asia, and North America. Flowers axillary or terminal, solitary or few, nodding or drooping; corolla pink, with four or five linear, revolute segments. Berry globose, fleshy, many-seeded. Leaves small, alternate, persistent, entire. Branches filiform. Both these plants naturally affect swampy spots, and the first-named is planted nearly always with a view to the periodic flooding of the beds; it will, however, thrive in a peaty border where no great amount of moisture is present, but under such conditions will not, of course, develop so quickly. *O. palustris* is a neat little plant, worth growing in pots or pans standing in water. The species may be propagated by means of the long, creeping shoots, which frequently root; or by cuttings, inserted under a hand glass, and shaded until established.

O. macrocarpus (large-fruited).* American Cranberry. *fl.* pink, on erect, proliferous branches. Spring. *l.* elliptic-oblong, nearly flat and obtuse, glaucous beneath. Stems prostrate, filiform, creeping. North America, 1760. This species is largely cultivated in North America for the sake of its fruits, which are bottled or put into barrels, &c., as well as used fresh for tarts, &c. (B. M. 2586, under name of *Vaccinium macrocarpum.*)

O. palustris (marsh-loving).* Common Cranberry. *fl.* pink, with reflexed, oblong segments; pedicels terminal, one-flowered. May. *fr.* dark red, with a strong acid taste. *l.* small, ovate, entire, acute, smooth, with revolute margins. Stems filiform, creeping. Northern hemisphere (Britain). (Sy. En. B. 876, under name of *Vaccinium Oxycoccus.*)

OXYDENDRON (from *oxys*, sour, and *dendron*, a tree; in allusion to the foliage being sour to the taste). Ord. *Ericaceæ.* A monotypic genus. The species is a beautiful, hardy tree; it thrives in a moist, peaty soil, and is propagated from imported seeds.

O. arboreum (tree-like).* Sorrel-tree. *fl.* white, in terminal panicles of many racemes; corolla ovate, five-toothed; filaments hairy; style thick, five-angled. June and July. *l.* oblong-lanceolate, acuminated, serrulate, glabrous. Branches tapering. *h.* 15ft. to 40ft. Eastern United States, 1752. Syn. *Andromeda arborea* (under which name it is figured in B. M. 905).

OXYGONIUM. Included under *Asplenium.*

OXYLOBIUM (from *oxys*, sharp, and *lobos*, a pod; legumes or seed-pods ending in a sharp point). Including *Callistachys* and *Podolobium.* Ord. *Leguminosæ.* A genus comprising about twenty-seven species of greenhouse ornamental shrubs, or rarely under-shrubs, confined to Australia. Flowers yellow, or partly or totally purple-red, disposed in terminal or axillary racemes; petals clawed; standard orbicular or reniform; wings oblong. Leaves opposite, whorled, or scattered, simple, entire, or rarely with pungent lobes. The species thrive in a compost of peat and loam, with plenty of sand added. Propagated, during April or May, by cuttings of rather firm young shoots, inserted in sand, under a bell glass. Perfect drainage is most essential. The species here described are those usually seen in greenhouses.

O. acutum (acute). *fl.* red, yellow, all axillary, in loose clusters, shorter than the leaves. March. *l.* in whorls of three, or scattered, ovate-elliptic or almost oblong, ¼in. to ⅜in. long, tapering into a pungent point. *h.* 2ft. 1842. (B. M. 4040, under name of *Gastrolobium acutum.*)

O. Callistachys (Callistachys).* *fl.* yellow, in dense, terminal racemes. June to August. *l.* lanceolate-acuminate, mostly in irregular whorls of three. *h.* 3ft. to 4ft. 1815. Syns. *Callistachys lanceolata* (B. R. 216), *C. longifolia* (P. M. B. viii. 31), *C. ovata* (B. M. 1925), *C. retusa* (L. B. C. 1983).

O. capitatum (headed). *fl.* yellow, in axillary clusters, or sometimes forming a terminal, compact, corymbose raceme or head. June. *l.*, lowest sometimes obovate, all the others oblong-lanceolate or linear, 1in. to 2in. long, obtuse, with a short, usually recurved point. *h.* 2ft. 1837. (B. R. 1843, 16.)

O. cordifolium (cordate-leaved). *fl.* orange-red, usually three or four together, in small, terminal heads or umbels. April. *l.* irregularly whorled in threes, ovate-cordate, from ⅛in. to ¼in. long. *h.* 1ft. to 2ft. 1807. (A. B. R. 492; B. M. 1544; L. B. C. 937.)

O. cuneatum obovatum (obovate, wedge-shaped).* *fl.* yellow, or the lower petals purple, in dense, corymbose racemes or

Oxylobium—*continued.*

clusters, either all axillary or also terminal. March. *l.* very broadly cuneate, truncate, mostly about 1½in. long. *h.* 2ft. 1840. (B. R. 1843, 36, and P. M. B. x. 243, under name of *O. obovatum.*)

O. ellipticum (elliptic-leaved).* *fl.* yellow, in crowded, corymbose racemes. May to September. *l.* from oval-oblong to oblong-linear or lanceolate, mucronate, arranged in irregular whorls of three. *h.* 2ft. to 3ft. 1805. (B. M. 3249). SYN. *O. Pultenæa* (L. B. C. 1947).

O. e. angustifolium (narrow-leaved). *l.* long, and narrow. 1805. A handsome variety when well grown. (B. M. 2442, B. R. 392, and L. B. C. 163, under name of *O. arborescens.*)

O. lineare (linear-leaved). *fl.* yellow, or of a dull red, in rather loose, terminal racemes, or sometimes in the upper axils. October. *l.* mostly alternate, linear or linear-lanceolate, 2in. to 6in. long, obtuse or mucronate, silky beneath when young. *h.* 2ft. 1838. (B. M. 3882, under name of *Callistachys linearis.*)

O. obovatum (obovate-leaved). A synonym of *O. cuneatum obovatum.*

O. obtusifolium (blunt-leaved).* *fl.* with keel and wings crimson, and the standard deep orange-coloured, and yellow at the base, disposed in terminal, often one-sided, racemes of 1in. to 2in., on very short pedicels. April. *l.* alternate or irregularly whorled in threes, linear, obtuse, smooth above, but clothed with silky tomentum beneath, with revolute edges. *h.* 1ft. to 3ft. 1825. A handsome, compact-growing plant. (S. F. A. 5.)

O. ovalifolium (oval-leaved). A synonym of *O. retusum.*

O. Pultenæ (Pulteney's), of Loddiges. A synonym of *O. ellipticum.*

O. retusum (retuse). *fl.* reddish-yellow, in dense, almost sessile, terminal clusters or corymbose racemes, or rarely also in the upper axils. May. *l.* mostly opposite, petiolate, ovate or oblong-elliptic, obtuse, truncate or emarginate, 1in. to 2in. long. *h.* 2ft. 1823. SYN. *O. ovalifolium.* (B. R. 913.)

O. scandens (climbing). *fl.* yellow, few, in loose, terminal or axillary racemes. April. *l.* mostly opposite, from obovate or ovate-elliptical to ovate-lanceolate or narrow-oblong, 1½in. to 2in. long. Branches procumbent or half climbing. *h.* 2ft. 1825. (B. R. 1434, under name of *Mirbelia Baxteri.*)

O. staurophyllum (cross-leaved). *fl.* yellow, in loose, axillary racemes, rarely exceeding the leaves. April. *l.* alternate or opposite, ⅜in. to 1½in. long, with pungent points and a cuneate base, and deeply divided into three lanceolate, pungent lobes; the lateral ones divaricate, and sometimes again bilobed. *h.* 2ft. 1822. (B. R. 959, L. B. C. 1177, and P. M. B. iv. 171, under name of *Podolobium staurophyllum.*)

O. trilobatum (three-lobed).* *fl.* yellow, in loose, axillary or terminal racemes, often exceeding the leaves. April. *l.* mostly opposite, from broadly ovate to lanceolate, 1in. to 2in. long, with pungent points, and bordered by a few distant, pungent teeth or lobes, of which one or two on each side near the base are usually larger than the others. *h.* 2ft. 1791. (A. B. R. 320, under name of *Pultenæa ilicifolia*; B. M. 1477 and B. R. 1333, under name of *Podolobium trilobatum.*)

O. virgatum (twiggy). *fl.* orange, scarlet, in terminal, sessile, corymbose racemes or clusters, and occasionally in the upper axils. May. *l.* in threes or opposite, narrow-oblong, or almost linear, rarely ovate-oblong, very obtuse and emarginate, ⅜in. to 1½in. long. 1830. (B. M. 3328, and B. R. 1647, under name of *Gastrolobium retusum.*)

OXYPETALUM (from *oxys*, sharp, and *petalum*, a petal; petals sharp-pointed). SYNS. *Gothofreda, Schizostemma*, and *Tweedia*. ORD. *Asclepiadeæ*. A genus comprising about fifty species of erect or twining, stove or greenhouse, perennial herbs or sub-shrubs, natives of South America, mostly Brazil, one species being found in Mexico and the West Indies. Flowers blue, white, yellowish-white, or purplish; calyx five-parted; corolla tube short, campanulate or almost globular, and with five often narrow lobes; cymes sometimes umbelliform, loosely few-flowered, sometimes capitate, rarely corymbosely branched, terminal or (in one species) axillary, pedunculate. Leaves opposite. The species mentioned below (probably the only ones introduced) like a rich, well-drained, loamy soil, and do best if planted out inside the stove or greenhouse, and their shoots trained near the glass. *O. cæruleum* is a charming climber, remarkable for the changes in colour exhibited by the flower at various stages of its existence. When first open, it is pale blue, with a slight tinge of green; then purplish, and, when withered, lilac. All are propagated by cuttings of the young growths, inserted under a bell glass, in bottom heat.

Oxypetalum—*continued.*

O. appendiculatum (appendiculate). *fl.* pale yellow, fragrant; petals narrow-lanceolate, acute, erectly spreading; peduncles cymose, usually four-flowered. *l.* ovate, acuminated, cordate, downy. Brazil, 1823. Stove twiner.

O. Banksii (Banks'). *fl.* purple; corolla segments linear or linear-lanceolate; peduncles lax-flowered, longer than the pedicels. June. *l.* cordate or ovate-cordate, shortly acuminate, incano-puberulous beneath. Brazil, 1826. Stove twining sub-shrub.

O. cæruleum (blue).* *fl.* blue; segments of corolla oblong, spreading; peduncles shorter than the leaves, few-flowered, erect. July. *l.* cordate-oblong or cordate-lanceolate, mucronate, tomentose on both sides. Buenos Ayres, 1832. Greenhouse or stove twining sub-shrub. (B. 55; B. M. 3630, under name of *Tweedia versicolor*; S. B. F. G. ser. ii. 407, under name of *T. cærulea.*)

O. solanoides (Solanum-like). *fl.* bluish, tinged with rose-colour; corolla segments spreading; peduncles terminal or extra-axillary, corymbosely paniculate, many-flowered. June. *l.* lanceolate or oblong-cordate, mucronate, acute, petiolate, tomentose. Stem almost unbranched, erect. *h.* 6ft. Brazil, 1846. Stove sub-shrub. (B. M. 4367.)

OXYSPORA (from *oxys*, sharp, and *spora*, a seed; in allusion to the seeds being awned at both ends). ORD. *Melastomaceæ*. A small genus (four species) of very handsome, slender, erect, or almost scandent, stove shrubs, natives of Eastern Bengal and the Malayan Archipelago. Flowers pink or red, disposed in terminal, elongated, many-flowered, loose, nodding panicles; calyx lobes and petals four. Leaves long-stalked, large, oblong or lanceolate-ovate, long-acuminate, entire or sinuate-toothed, five to seven-nerved. *O. paniculata*, the only species introduced, thrives in a compost of sandy loam and fibry peat, with the addition of some small pieces of charcoal. Propagation may be effected by cuttings of young shoots, inserted in sandy soil, under a glass, in bottom heat, in April.

O. paniculata (panicled). *fl.* disposed in lax, drooping panicles, often 1ft. long; petals four, bright rose-colour, obovate, acute. Autumn. *l.* ovate or cordate-ovate, acuminate, five to seven-nerved, glabrous above, and obsoletely downy, with short hairs, or quite glabrous below, where also the nerves are very prominent, and red. *h.* 3ft. to 5ft. India, 1826. (B. M. 4553, under name of *O. vaginans.*)

O. vagans (wandering). A synonym of *O. paniculata.*

OXYSTELMA (from *oxys*, sharp, and *stelma*, a girdle; in reference to the segments of the corona being acute). ORD. *Asclepiadeæ*. A small genus (four species) of stove, climbing, glabrous herbs or sub-shrubs, natives of tropical Asia and Africa. Flowers rather large; corolla purple-spotted and veined, rather broad; cymes loosely racemose or umbelliform, not unfrequently reduced to one flower. Leaves opposite, narrow. *O. esculentum* is the only species in cultivation; it thrives in a compost of loam, leaf mould, and sand. Good drainage is essential. Like many other stove climbers, it perhaps does best when planted out against a wall or rafter, and its shoots trained near the glass.

O. esculentum (esculent). *fl.* white, with a tinge of rose, large; corolla fringed with hairs; racemes longer than the leaves. *l.* linear-lanceolate, veiny, smooth, 4in. to 6in. long. India, Java, &c., 1815.

OXYTROPIS (from *oxys*, sharp, and *tropis*, a keel; the keel ends in a sharp point). ORD. *Leguminosæ*. An extensive genus (nearly 100 species) of hardy, much-branched herbs, sub-shrubs, or small shrubs, allied to *Astragalus*. They are found in the mountainous or cold regions of Asia, North America, and Europe. Flowers violet, purple, white, or pale yellowish, in axillary spikes or racemes, or springing from the stem; standard erect, ovate or oblong; petals unguiculate. Pods sessile or stipitate. Leaves impari-pinnate; leaflets entire, exstipellate. Several species are very handsome, but many which were at one time much grown are now lost to cultivation. They are of easy culture in any ordinary soil, but prefer a dry sandy loam. Propagated by seeds, sown in their permanent quarters; and by dividing the plant in spring. All the species mentioned below are pretty, dwarf-growing perennials.

Oxytropis—*continued.*

O. campestris (field). *fl.* cream-coloured, the keels and wings tinged with purple, erect; spikes ovate-oblong, dense-flowered; scapes hairy, about equal in length to the leaves. July. *l.*, leaflets many pairs, lanceolate, acute, hoary, and rather hairy. *h.* 3in. to 6in. Europe (Scotland). A pretty little alpine plant. (Sy. En. B. 374.)

O. fœtida (fœtid). *fl.* cream-coloured; spikes capitate, few-flowered; scapes rather longer than the leaves, woolly at the apex. June to August. *l.* with many pairs of lanceolate-linear, clammy, glabrous leaflets. South France, &c., 1819.

O. frigida racemosa (frigid, racemed). *fl.* ½in. long, in a short, spike-like raceme; peduncles longer than the leaves, hairy. *l.* erect, pinnate, 3in. to 4in. long, having narrow-lanceolate leaflets of a glaucous hue, and covered with adpressed hairs. Turkestan, 1884. Plant stemless. (R. G. 1154, f. 2, f-k.)

O. grandiflora (large-flowered). *fl.* of an intense rose-colour, large, loosely spicate; standard emarginate; scape twice as long as the leaves. June. *l.* oblong-lanceolate, adpressedly silky. *h.* 6in. Siberia, 1820.

O. Halleri (Haller's). *fl.* of a rich bluish-purple colour, rarely white, in round, dense heads; scapes solitary or twin, longer than the leaves. July. *l.*, leaflets ovate, acute. Plant stemless, clothed with silky hairs in every part. *h.* 6in. Europe (Scotland). An elegant little species for rockwork. (Sy. En. B. 373.)

O. Lambertii (Lambert's).* *fl.* rosy-carmine, large, spicate or capitate; scape rather longer than the leaves. August. *l.*, leaflets lanceolate, acute, rather remote. *h.* 6in. to 12in. North America, 1811. Plant stemless, silky and pilose in every part. A rare and beautiful rock-plant. (B. M. 2147; B. R. 1054.)

O. montana (mountain).* *fl.* bluish, with a purplish calyx; racemes short; scape a little longer than the leaves. July. *l.*, leaflets elliptic-lanceolate. Plant almost stemless, villous, the hairs on the petioles and scape spreading. *h.* 6in. Europe, 1581.

O. ochroleuca (yellowish-white). *fl.* yellowish-white, small, drooping, in short racemes; peduncles long, and, together with the calyx and ovary, covered with blackish hairs. *l.* pinnate,

Oxytropis—*continued.*

3in. to 4in. long, with oblong-lanceolate leaflets. Stem short, ascending, glaucescent. Turkestan, 1884. (R. G. 1154, f. 1, a-e).

O. pilosa (long-haired). *fl.* pale yellow, disposed in ovate-oblong spikes; peduncles axillary, longer than the leaves. July. *l.*, leaflets lanceolate, acute. Stem erect, softly pilose. *h.* 6in. Siberia, 1732. (B. M. 2483; J. F. A. 51, under name of *Astragalus pilosus.*)

O. pyrenaica (Pyrenean).* *fl.* sky-blue, erect, crowded, on a short raceme, which ultimately becomes elongated-oval; scapes set with stellate hairs. Summer. *l.*, leaflets lanceolate or oblong, pointed, somewhat concave, covered with long, silky hairs. *h.* 4in. to 6in. Central Pyrenees.

OXYURA. Included under **Layia** (which *see*).

OYSTER PLANT. *See* **Mertensia maritima.**

OYSTER SCALE. *See* **Scale Insects.**

OZOTHAMNUS (from *ozein*, to smell, and *thamnos*, a shrub; alluding to the odour of the plant). ORD. *Compositæ.* A genus comprising a considerable number of species of greenhouse or nearly hardy, mostly Australian shrubs, rarely sub-shrubs or herbs, now included, by Bentham and Hooker, under *Helichrysum.* Flower-heads small; involucre oblong, ovoid, or campanulate; inner bracts usually with small, coloured, radiating tips. The species described below thrives in almost any soil, and is readily propagated, in summer, by means of cuttings made of the half-ripened young wood.

O. rosmarinifolius (Rosemary-leaved).* *fl.-heads* white, in dense corymbs, usually terminating in numerous, small, leafy branches, forming a large, leafy panicle. July. *l.* linear, mostly obtuse, varying from under ½in. to above 1in. long, the margins recurved or revolute. *h.* (in Australia) 8ft. to 9ft. 1827. A handsome shrub, hardy in the South of England.

END OF VOLUME II.